APPENDIX K

CONTAMINATION ASSESSMENT

Proposed Segment Factory

Contamination Assessment

Prepared for Snowy Hydro Limited
September 2019

EMM
creating opportunities

Proposed Segment Factory

Contamination Assessment

Report Number

J17188 RP99

Client

Snowy Hydro Limited

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Version

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Prepared by	**Approved by**
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25 September 2019	25 September 2019

This report has been prepared in accordance with the brief provided by the client and has relied upon the information collected at the time and under the conditions specified in the report. All findings, conclusions or recommendations contained in the report are based on the aforementioned circumstances. The report is for the use of the client and no responsibility will be taken for its use by other parties. The client may, at its discretion, use the report to inform regulators and the public.

This report has been written with the express intent to inform development of the proposed Project design and EIS. The data were obtained to provide Snowy Hydro Ltd with additional information to assist the scoping of environmental and contamination management measures for the construction phase of the project. Subsurface conditions relevant to construction works should be assessed by contractors who can make their own interpretation of the data provided and perform additional investigations in accordance with relevant NSW guidelines as necessary for their own purposes.

There are always some variations in subsurface conditions across a site that cannot be defined even by exhaustive investigation. Hence, it is unlikely that the measurements and values obtained from sampling and testing during the investigation represent the extremes of conditions which may be encountered. As subsurface conditions may vary, the observations and analytical data represent subsurface conditions at the specific test locations only. Conditions exposed during future excavation works undertaken for the Project could vary significantly from the information provided in this report. Furthermore, subsurface conditions can change over time. This should be borne in mind, particularly if the report is used after a protracted delay.

Executive Summary

This Contamination Assessment was completed to support an environmental impact statement (EIS) for a proposed segment factory, required as part of the construction of Snowy 2.0. It is proposed to develop a factory that will manufacture concrete segments that will be used to line the underground tunnels excavated for different phases of Snowy 2.0 including the Exploratory Works and Main Works.

The location of the proposed segment factory is on land owned by Snowy Hydro Limited (Snowy Hydro) in Polo Flat, an industrial area located to the north-east of Cooma. Following commencement of this contamination assessment, the preferred location for the proposed segment factory was amended and the site boundaries were adjusted, with an additional area of land included in the site (comprising Lot 3 in DP 238762 in the south eastern portion of the site).

This assessment included a review of historical information, a site inspection and collection of soil and groundwater samples at locations selected to target areas of potential contamination observed during the site inspection and the area of the proposed factory location. No intrusive investigations were undertaken in the south eastern portion of the site due to the late inclusion of this lot within the site boundaries.

Samples were submitted for laboratory testing for a range of analytes, based on the outcomes of the desktop study and observations made during the site inspection.

Fragments of potential asbestos containing material (ACM) were observed at a number of locations across the site surface and confirmed as containing asbestos by laboratory testing. No contaminants of potential concern (CoPC) were reported in soil samples at concentrations greater than the adopted site assessment criteria for commercial/industrial land use.

Groundwater was identified as having concentrations of some metals greater than the adopted assessment criteria for protection of 95% of species in freshwater. However, due to the disturbed nature of the surrounding environment and the distance to any substantial and permanent watercourse, this is not considered to present an unacceptable risk to the project or preclude the proposed development on the site. No other analysed CoPC were reported in groundwater at concentrations greater than the adopted assessment criteria.

While the findings of the intrusive investigations did not indicate the presence of significant contamination in the areas investigated, in the context of future commercial/industrial land use, the conceptual site model identified complete linkages between contamination sources and receptors. Notwithstanding, the preliminary qualitative risk assessment identified that minor remediation and management measures could be implemented to manage and reduce the identified risks.

Remediation and management measures are therefore recommended to minimise impacts to site users, surrounding workers and the environment. An Environmental Management Plan (EMP) would be required to inform the management requirements for the construction and operation of the facility.

Based on the findings of this Contamination Assessment, recommendations for remediation and management include the following:

- Completion of targeted soil sampling in Lot 3 in DP 238762 in the vicinity of the transmission tower, buildings and storage area, services pit, creek bed and at the approximate air crash site. A hazardous materials assessment of the buildings in this portion of the site should also be undertaken prior to demolition.

- Undertaking a surface clearance (emu bob or similar) to remove fragments of ACM observed at the site surface. An Asbestos Management Plan (AMP) would be required to document the clearance methodology and validation requirements, in accordance with the relevant regulations and guidelines. The surface clearance should be extended across the south-eastern portion of the site for completeness.

- Due to the identification of ACM at the site surface, any topsoil or other materials excavated from the site will require further testing to confirm suitability for re-use on-site or appropriate classification for off-site disposal. Any materials imported to the site for use in earthworks must be certified virgin excavated natural materials (VENM) or excavated natural materials (ENM) with an appropriate exemption. Note: this requirement is in addition to any technical specification required for construction purposes and does not apply to aggregates brought onto site for concrete production.

- An EMP will need to be prepared to document the above requirements, as well as typical environmental management measures applied at construction sites, including:

  - an unexpected finds protocol, including procedures to identify and manage contamination, if encountered;

  - procedures for the handling and storage of waste including contaminated materials;

  - surface water management and sediment and erosion control;

  - requirements for the storage of dangerous goods and other materials; and

  - decommissioning requirements, including remediation and rehabilitation if necessary.

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Acronyms

Term	Definition
ACM	Asbestos containing material
ACT	Australian Capital Territory
AFFF	Aqueous film-forming foam
ANZECC	Australian and New Zealand Environment and Conservation Council
AMP	Asbestos management plan
AS	Australian Standard
ASS	Acid sulfate soils
AST	Aboveground storage tank
CBP	Concrete batching plant
CLM Act	Contaminated Land Management Act 1997 (NSW)
CoPC	Contaminants of potential concern
CSM	Conceptual site model
DA	Development application
DEE	Department of the Environment and Energy (Commonwealth)
DP	Deposited Plan
DPIE	Department of Planning, Industry and Environment (NSW)
DQI	Data quality indicators
DQO	Data quality objectives
EC	Electrical conductivity
EIL	Ecological investigation level
EIS	Environmental impact statement
EMM	EMM Consulting Pty Ltd
EMP	Environmental management plan
EPA	Environment Protection Authority
EPBC Act	Environment Protection and Biodiversity Conservation Act 1999 (Commonwealth)
EPL	Environment Protection Licence
ESL	Ecological screening level
FGJV	Future Generation Joint Venture
HBM	Hazardous building materials
HIL	Health investigation level
HSL	Health screening level
KNP	Kosciusko National Park
MA	Materials Assessment (Robson 2009)
m bgl	Metres below ground level

Term	Definition
NEPC	National Environment Protection Council
NEPM	National Environmental Protection (Assessment of Site Contamination) Measure, as amended (2013)
NSW	New South Wales
OCP	Organochlorine pesticides
OPP	Organophosphorus pesticides
PAH	Polycyclic aromatic hydrocarbon
PCB	Polychlorinated biphenyl
PFAS	Per- and polyfluoroalkyl substances
PID	Photoionisation detector
POEO Act	Protection of the Environment Operations Act 1997 (NSW)
ppm	Parts per million
PSI	Preliminary site investigation
QA/QC	Quality assurance/quality control
SAC	Site assessment criteria
SAQP	Sampling analysis and quality control plan
SEAR	Secretary's Environmental Assessment Requirement (NSW)
SEPP 55	State Environmental Planning Policy No 55 – Remediation of Land (NSW)
SMRC	Snowy Monaro Regional Council
SSI	State significant infrastructure
TBM	Tunnel boring machines
USCS	United Soil Classification System
USEPA	United States Environmental Protection Agency
UST	Underground storage tank
VENM	Virgin excavated natural material
VOCs	Volatile organic compounds

1 Introduction

1.1 Snowy 2.0

Snowy Hydro Limited (Snowy Hydro) proposes to develop Snowy 2.0, a large-scale pumped hydro-electric storage and generation project which would increase hydro-electric capacity within the existing Snowy Mountains Hydro-electric Scheme (Snowy Scheme). Snowy 2.0 is the largest committed renewable energy project in Australia and is critical to underpinning system security and reliability as Australia transitions to a decarbonised economy. Snowy 2.0 will link the existing Tantangara and Talbingo reservoirs within the Snowy Scheme through a series of underground tunnels and a new hydro-electric power station will be built underground.

Snowy 2.0 has been declared to be State significant infrastructure (SSI) and critical SSI by the NSW Minister for Planning under Part 5 of the NSW *Environmental Planning and Assessment Act 1979* (EP&A Act). Critical SSI is infrastructure that is deemed by the NSW Minister for Planning and Public Spaces to be essential for the State for economic, environmental or social reasons. An application for critical SSI must be accompanied by an environmental impact statement (EIS).

Separate applications are being submitted by Snowy Hydro for different phases of Snowy 2.0, including Exploratory Works for Snowy 2.0 (the Exploratory Works) and Snowy 2.0 Main Works (the Main Works).

The first phase of Snowy 2.0, the Exploratory Works (Application Number SSI 9208), includes an exploratory tunnel and portal and other exploratory and construction activities primarily in the Lobs Hole area of the Kosciuszko National Park (KNP). Exploratory Works has been assessed in a separate EIS and is subject to an approval issued by the former NSW Minister for Planning on 7 February 2019. Construction for Exploratory Works has already commenced.

The second phase of Snowy 2.0, the Snowy 2.0 Main Works (Application Number SSI 9687), covers the major construction elements of Snowy 2.0, including permanent infrastructure (such as the underground power station, power waterways, access tunnels, chambers and shafts), temporary construction infrastructure (such as construction adits, construction compounds and accommodation), management and storage of extracted rock material and establishing supporting infrastructure (such as road upgrades and extensions, water and sewage treatment infrastructure, and the provision of construction power). Snowy 2.0 Main Works also includes the operation of Snowy 2.0. The EIS for Snowy 2.0 Main Works has been submitted to the Department of Planning, Industry and Environment (DPIE).

A separate application has also been submitted for a proposed factory that would manufacture precast concrete segments that would line the tunnels being excavated for Snowy 2.0 (Application Number SSI 10034). This Contamination Assessment supports the EIS for the proposed segment factory.

On 26 June 2019, Snowy Hydro referred the proposed segment factory (Reference Number 2019/8481) to the Commonwealth Minister for the Environment under the provisions of the Commonwealth *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act). On 13 August 2019, the proposed segment factory was determined by the Acting Assistant Secretary Assessments and Waste Branch of the Commonwealth Department of the Environment and Energy (DEE), as delegate to the Minister, to be 'not a controlled action' and therefore does not require further assessment or approval under the EPBC Act.

1.2 The proposed segment factory

The tunnels for Snowy 2.0, including the exploratory tunnel for Exploratory Works and underground tunnels linking Tantangara and Talbingo reservoirs for the Main Works, would be excavated, for the most part, using tunnel boring machines (TBMs) and would be lined using precast concrete segments. These segments are proposed to be manufactured at the proposed segment factory to be located on the south-eastern side of Polo Flat (the site), which is an industrial area located to the east of Cooma.

The proposed segment factory would contain a building for the casting and curing of the segments, uncovered storage areas for raw materials and segments, vehicle parking areas and associated offices and workshops.

Main inputs for the segments include aggregate, sand, cement and rebar steel. Primary outputs include the segments which would be transported to the TBM launch sites for Exploratory Works and Main Works within KNP.

The construction phase of the proposed segment factory would last about five months utilising a workforce of about 30 people. Construction would take place six days a week (from Monday to Saturday) and for 10 hours per day.

The factory would operate over a period of about 3.5 years utilising a workforce of about 125 people. It would be operational 24 hours a day, seven days a week.

The proposed segment factory would be constructed and operated by Future Generation Joint Venture (FGJV) which has been contracted by Snowy Hydro to construct Snowy 2.0.

At the completion of the construction of Snowy 2.0, the proposed segment factory would be decommissioned.

Further details of the proposed segment factory are provided in Chapter 2 of this report.

1.3 Location of the site

The site of the proposed segment factory is located on the south-eastern side of Polo Flat, predominantly on the southern part of the land owned by Snowy Hydro. The site is located to the east of Polo Flat Road and to the north of Carlaminda Road.

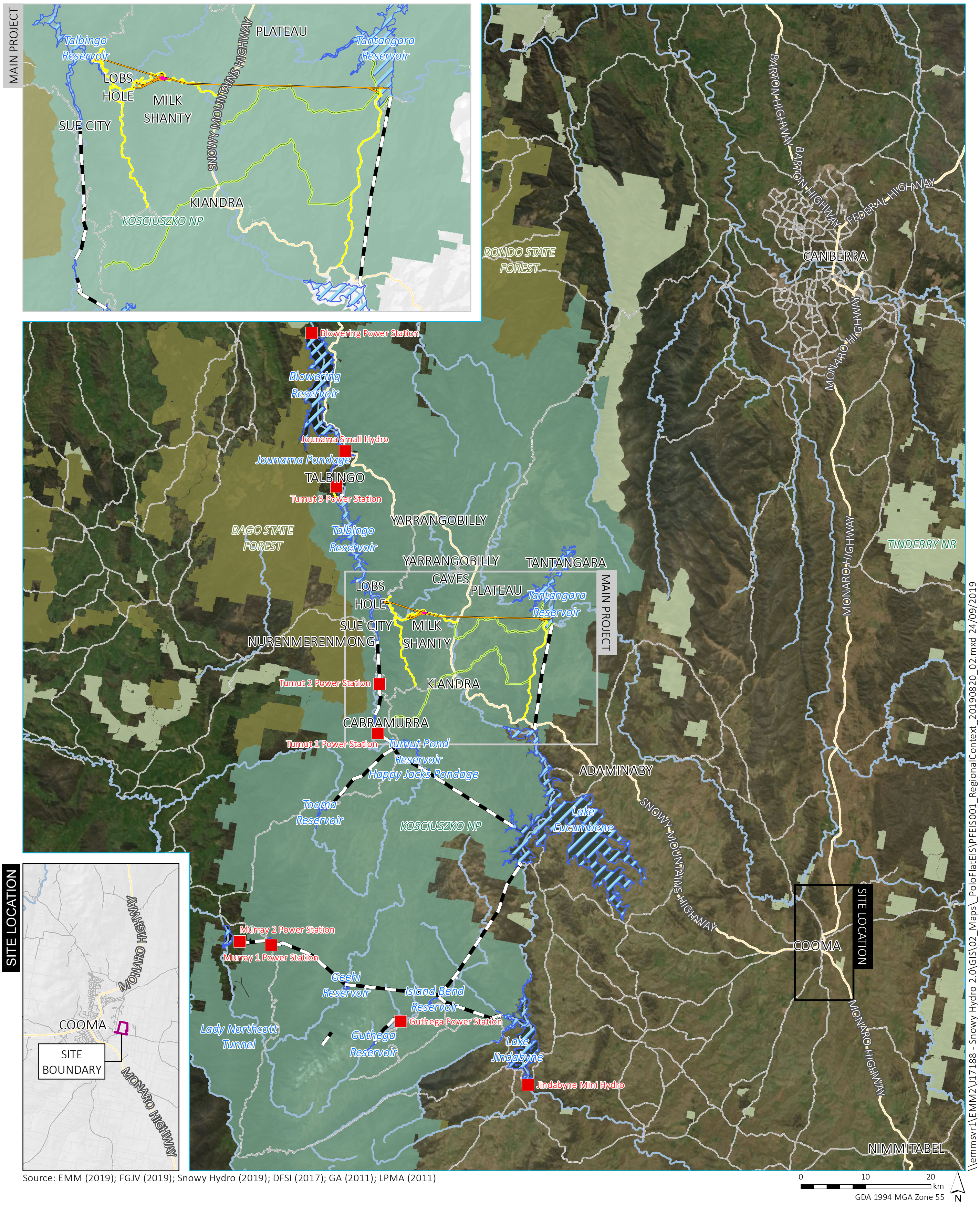
Figure 1.1 shows the location of the site in a regional context and Figure 1.2 shows the site in its local context.

The site contains the following land parcels:

- southern part of Lot 14 in Deposited Plan (DP) 250029 – also known as 9 Polo Flat Road, Polo Flat;
- Lot 3 in DP 238762 – also known as 33 Carlaminda Road, Polo Flat; and
- an unmade road corridor, directly south of the aforementioned lots.

Except for a few buildings located on the southern part of Lot 3 in DP 238762, the site is vacant and dominated by grassland. A third order watercourse flows in a north-westerly direction through the middle of the site.

Lot 14 in DP 250029 is a large parcel of land which contains a private airfield predominantly located in the middle and northern part of the land. This airfield was originally established in 1921 and further developed in the late 1950s and 1960s to service the Snowy Scheme. It became the base for the Snowy Mountains Hydro-electric Authority's (the predecessor to Snowy Hydro) flying unit and aircraft. The land was sold by Snowy Hydro in 1998 where it continued use as a private airfield. Snowy Hydro purchased the land again in early 2019.



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Source: EMM (2019); FGJV (2019); Snowy Hydro (2019); DFSI (2017); GA (2011); LPMA (2011)

KEY

▭ Site boundary

Snowy 2.0 project elements

— Utilities

— Tunnels, portals, intakes

— Power station

— Permanent roads and surface infrastructure

Existing Snowy Scheme

🟥 Existing power station

▬ Existing pipeline tunnel

▨ Scheme storage

— Main road

— Local road or track

— Watercourse

▨ Kosciuszko National Park

▨ NPWS reserve

▨ State forest

Location of the project area

Snowy 2.0
Contamination Assessment
Proposed Segment Factory
Figure 1.1

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Source: EMM (2019); FGJV (2019); Snowy Hydro (2019); DFSI (2017); GA (2011); LPMA (2011)

0 0.5 1 km

GDA 1994 MGA Zone 55

N

KEY

- ▭ Site boundary
- – – Rail line
- — Main road
- — Local road or track
- — Watercourse
- ☐ Cadastral boundary
- 🟩 NPWS reserve

Location of site in local context

Snowy 2.0
Contamination Assessment
Proposed Segment Factory
Figure 1.2

The site is surrounded by industrial development to the west and predominantly rural land to the south and east. To the north of the site is the remainder of Lot 14 in DP 250029 which contains the private airfield, and other industrial development. Snowy Hydro's private airfield contains a main north-south aligned runway, hangers and offices. It also contains an above ground fuel tank for the refuelling of planes and helicopters.

Lot 3 in DP 238762 contains a communications tower which will cease use (ie transmission) in August 2019.

There is an isolated industrial operation containing a residence located about 150 metres (m) to the south-east of the site, and an abattoir located about 350 m to the east.

The nearest residence is a rural residence located about 450 m to the south-south-east of the site. The nearest residences within Cooma are located about 1 km to the west of the site.

1.4 Proponent

Snowy Hydro is the proponent for the proposed segment factory. Snowy Hydro is an integrated energy business – generating energy, providing price risk management products for wholesale customers and delivering energy to homes and businesses. Snowy Hydro is the fourth largest energy retailer in the NEM and is Australia's leading provider of peak, renewable energy.

As previously stated, the proposed segment factory would be constructed and operated by FGJV which has been contracted by Snowy Hydro to construct Snowy 2.0.

1.5 Purpose of this report

This Contamination Assessment supports the EIS for the proposed segment factory.

To address the requirements of the Secretary's Environmental Assessment Requirements (SEARs) *and State Environmental Planning Policy No 55 – Remediation of Land* (SEPP 55), the primary purpose of this Contamination Assessment is to evaluate the potential for contamination to be present at the site as a result of past or present activities and to evaluate the potential suitability of the site for the proposed use.

Following a review of siting options, the preferred location for the proposed segment factory was determined to be in the southern portion of Lot 14 in DP 250029 and Lot 3 in DP 238762 (refer Section 4.1). The initial study area included the northern portion of Lot 14 and, therefore, this assessment includes some investigation work which is now outside the site. Additionally, no intrusive investigations were undertaken on Lot 3 in DP 238762, as this portion of land was added to the site after the field investigations were completed. Recommendations for targeted soil investigations in Lot 3 are discussed in Section 11 of this report.

This Contamination Assessment comprises:

- site history assessment and data review to identify historical activities that may have had the potential to cause contamination of the site, which includes a review of historical aerial photographs, land titles (where available) and site plans;
- assessment of the environmental setting of the site;
- site inspection to identify potential sources and areas of contamination;
- a materials assessment (MA), to assess the composition of fragments of cement sheeting observed on the site surface and other potential HBM;
- soil sampling;

- construction of monitoring bores for groundwater assessment and groundwater sampling;
- laboratory analysis of soil and groundwater samples for selected contaminants of potential concern (CoPC), based on the outcomes of the site history assessment and inspection; and
- preparation of a report detailing the findings of the assessment.

Surface water sampling could not be conducted as part of this investigation as the drainage lines within the site were dry and no surface water was present at the time of the site walk-over and field works.

1.6 Planning framework and requirements

This Contamination Assessment has been prepared in accordance with the SEARs issued by the NSW DPIE on 31 July 2019. Table 1.1 lists the matters relevant to this assessment and where they are addressed in this report.

Table 1.1 Relevant matters raised in SEARs

Requirement	Section addressed
An assessment of impacts of the project on the soils and land capability of the site, including potential impacts associated with the use of hydrocarbons and chemicals and dealing with any contaminated soil on site.	Section 8 Section 12
A strategy to manage the progressive rehabilitation of the land disturbed by the project	Section 12

2 Project description

2.1 Introduction

It is proposed to construct and operate a factory on the site to supply precast concrete segments that would line the tunnels for Snowy 2.0.

The construction phase of the proposed segment factory would last about five months utilising a workforce of about 30 people. The operational phase would last about 3.5 years utilising a workforce of about 125 people.

The proposed segment factory would be decommissioned at the completion of operations.

2.2 Construction

2.2.1 Main activities

The following main activities would be undertaken for the construction of the proposed segment factory:

- demolition and removal of buildings and decommissioned telecommunications tower on the southern part of site;
- clearing, removal of topsoil and vegetation (topsoil excavated would be stockpiled on site for later use);
- undertaking earthworks to establish level surfaces;
- establishment of primary access road;
- installation of site services (power, water and communications);
- establishment of site surfaces (ie concrete, asphalt and cement soil); and
- construction of site facilities and buildings, including precast building, concrete batching plant (CBP), workshops, offices, parking areas, storage areas and associated facilities.

2.2.2 Earthworks

Excavation will be carried out at the site to provide level surfaces, establish the access road and create the required trenches for drainage.

Where possible excavated material would be reused on site for filling and compaction (including benching areas of the site where required). Where there is a deficit of excavated material, additional material would be sourced from local quarries.

2.2.3 Traffic movements

Construction vehicle movements will comprise construction worker’s light vehicles and heavy vehicles transporting equipment, building and construction materials, waste, and fill material if required.

2.2.4 Construction timeframe and hours

The construction phase of the proposed segment factory would last about five months (estimated to commence in March 2020 subject to obtaining the required approvals). Construction would be undertaken from Monday to Saturday for 10 hours per day. Access to the site would generally start at 6 am for pre-starts and toolbox talks, and construction would commence at 7 am.

2.2.5 Workforce

A workforce of about 30 people would be required to construct the proposed segment factory.

2.3 Operations

2.3.1 General

The segments would be produced by casting concrete (made in the concrete batching plant (CBP)) in reusable steel moulds which would then be cured in a chamber. Following curing, the segments would be temporarily stored onsite before being transported to the TBM launch sites within KNP.

The casting and curing would be undertaken in the precast building. Storage of the segments would predominantly be undertaken in uncovered storage areas.

Main inputs for the segments include aggregate, sand, cement and steel rebar.

Approximately 130,500 segments would be manufactured over the operational period.

2.3.2 Site layout

The layout of the proposed segment factory is shown in Figure 2.1. Details of the site layout are provided below.

i General layout

The CBP and precast building (which contains a casting room and curing chamber) would be located at the southern end of the site. Open storage areas would be located predominantly to the north of the building on the northern part of the site.

Site offices and workshops would be located in the south-western corner of the site.

ii Ingress and egress

Vehicle ingress and egress to the site would be provided on a new access road which would connect to Polo Flat Road. The access road would be constructed on an existing informal service road located in the unmade road corridor immediately north of Carlaminda Road.

iii Raw materials storage

Cement silos, and aggregate and sand storage areas for the CBP would be located adjacent to the CBP. Storage would be sized to hold approximately three days production.

Other raw materials include steel rebar and concrete admixtures which would be stored in, or adjacent to, the precast building.

Source: EMM (2019); FGJV (2019); Snowy Hydro (2019); DFSI (2017); ESRI (2019); GA (2011); LPMA (2011)

KEY

▭ Site boundary
— Local road or track
☐ Cadastral boundary
— Indicative site layout
🟨 Precast yard, concrete plant, aggregates area, precast warehouse, segment storage
🟪 Bus stop and parking
🟦 Offices, guard house and first aid
🟧 Mechanical and plant workshop with parking
⬜ Trailer parking
🟩 Storage area
🟩 Emergency storage area
🟦 Detention basin
🟦 Drainage

Proposed layout

Snowy 2.0
Contamination Assessment
Proposed Segment Factory
Figure 2.1

iv Parking

Two large parking areas are proposed in the south-western corner of the site, and to the north of the precast building. Parking in the south western area would be used for light vehicles, trucks and buses. Parking to the north of the precast building would be used for trucks.

v Drainage

A diversion drain would be constructed around the eastern perimeter of the site to divert water from the third order watercourse. The drain diversion would be constructed to match the general width and depth of the existing watercourse.

A detention basin would be provided to the north of the site to collect surface flows. Overflows from the detention basin would be directed into the diversion drain.

2.3.3 Utility connections

The proposed segment factory would be connected to utility mains, including communications, electricity, water, wastewater and gas.

2.3.4 Segment inputs

As previously stated, main inputs for the precast concrete segments include aggregate, sand, cement and steel rebar. These inputs would likely be sourced locally or from Canberra.

In addition to these main inputs, several accessories are also required to produce the segments, such as reinforcement cages, steel fibres, gaskets and inserts. These inputs would likely be sourced from Canberra.

2.3.5 Segment transport

Following casting, curing and storage, the segments would be transported to the TBM launch sites within KNP.

2.3.6 Traffic movements

Operational vehicle movements will comprise light vehicles (worker's vehicles and service vehicles) and heavy vehicles required for the transportation of the main inputs for the segments and for the transportation of the segments from the site to the TBM launch sites within KNP.

2.3.7 Staff and manpower

A workforce of about 125 people would be required to operate the proposed precast segment factory. As many local workers as possible would be sourced from the Snowy Mountains Regional LGA and surrounding localities.

2.3.8 Hours of operation

It is proposed to operate the proposed segment factory 24 hours a day, seven days a week. It is estimated that the factory would operate for a period of about 3.5 years.

2.4 Decommissioning

As previously stated, the proposed segment factory would be decommissioned at the completion of construction of Snowy 2.0 which would include removal of all plant and equipment. Snowy Hydro would retain the main structures such as the precast building, workshops and offices and seek to use these for an alternative industrial use.

It is envisaged that Snowy Hydro would submit a separate application for approval for an alternative use of the site prior to the decommissioning phase of the project.

3 Regulatory framework and guidelines

3.1 NSW Legislation

An overview of NSW legislation informing this assessment is provided below.

3.1.1 NSW Contaminated Land Management Act 1997

The NSW *Contaminated Land Management Act 1997* (CLM Act) aims to promote the better management of contaminated land. The objectives of this Act are to establish a process for investigating and (where appropriate) remediating land areas where contamination presents a significant risk of harm to human health or some factor of the environment.

The NSW Environment Protection Authority (EPA) has powers to respond to contamination that is causing significant risk of harm to human health or the environment. The NSW EPA can direct land owners to investigate or remediate contaminated land and requires land owners to report contamination where there is a significant risk of harm (duty to report). The CLM Act may be triggered if contamination migrates beyond site boundaries.

3.1.2 NSW Protection of the Environment Operations Act 1997

The NSW *Protection of the Environment Operations Act 1997* (POEO Act) is administered by the NSW EPA. It prohibits any person to cause pollution of waters, land or air and provide penalties for specified offences. The POEO Act enables the NSW Government to set out explicit protection of the environment policies and adopt more innovative approaches to reducing pollution. The POEO Act also requires "scheduled activities" listed at Schedule 1 to the POEO Act to be carried out in accordance with an Environment Protection Licence (EPL). An EPL is required to operate the proposed segment factory.

3.2 Guidelines

This contamination assessment has been completed in general accordance with the requirements of:

- *National Environment Protection (Assessment of site Contamination) Measure (2013)*, including 20 Schedules and Appendices (B1 to B9), and the NEPM Toolbox, updated April 2014 (the ASC NEPM);

- Australian and New Zealand Environment and Conservation Council and the National Health and Medical Research Council (1992) *Guidelines for Assessment and Management of Contaminated sites;*

- Australian and New Zealand Environment and Conservation Council and the National Health and Medical Research Council (1992) *National Water Quality Management Strategy - Australian Water Quality Guidelines for Fresh and Marine Waters;*

- Australian and New Zealand Environment and Conservation Council and Agriculture and Resource Management Council of Australia and New Zealand (2000) *National Water Quality Management Strategy - Australian and New Zealand Guidelines for Fresh and Marine Water Quality;*

- Standards Australia (2005) Australian Standard AS4482.1 - *Guide to the Investigation and Sampling of sites with Potentially Contaminated Soil. Part 1: Non-volatile and Semi-Volatile Compounds*;

- Standards Australia (1999) Australian Standard AS 4482.2 *Guide to the sampling and investigation of potentially contaminated soil. Part 2: Volatile substances; and other relevant guidelines and legislation*;

- NSW Department of Environment and Conservation (2006) *Guidelines for the NSW site Auditor Scheme;*
- NSW Department of Environment and Conservation (2007) *Guidelines for the Assessment and Management of Groundwater Contamination*;
- NSW Office of Environment and Heritage (2011) *Guidelines for Consultants Reporting on Contaminated sites*;
- NSW EPA (2016) *Designing Sampling Programs for sites Potentially Contaminated by PFAS*; and
- HEPA (2018) *PFAS National Environmental Management Plan,* Heads of EPAs Australia and New Zealand, January 2018.

4 Site description

4.1 Background

The segment factory was originally proposed to be sited on Lot 14 in DP 250029 only. This included:

- locating the precast building and segment storage area in the south-western corner of the lot; and
- locating offices and an access road for light vehicles near the existing hangers which are located in the middle of the lot on its western side.

The initial study area for the contamination assessment was therefore focused on Lot 14. Following completion of a siting options assessment the layout of the proposed segment factory was amended to be located on Lot 3 and the southern portion of Lot 14 only.

Figure 4.1 compares the initial study area boundaries to the final layout plan for the site and presents the areas of investigation.

4.2 Site identification

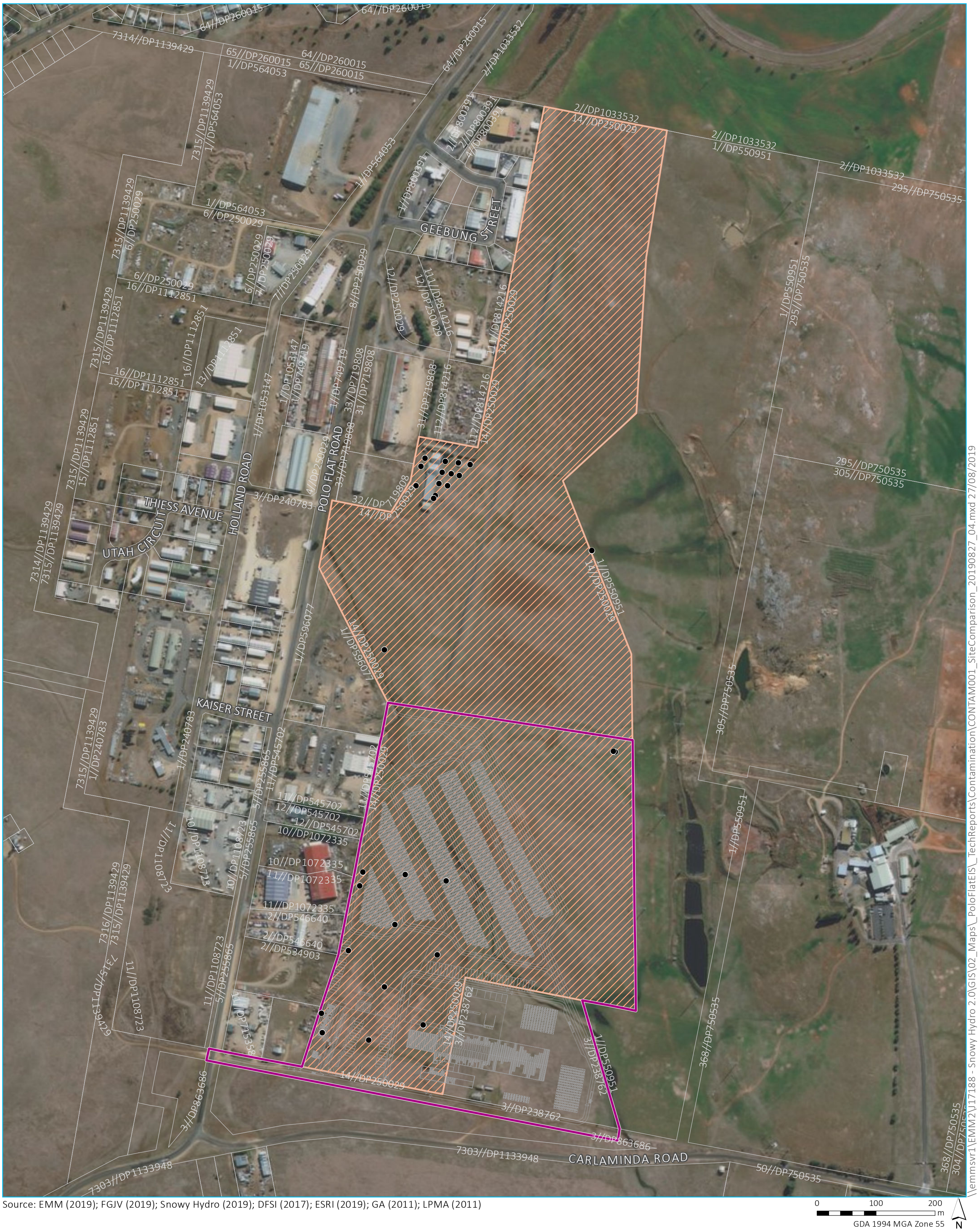
The site is located in the Polo Flat industrial area, approximately 1.8 km to the east of the centre of Cooma. The site has been partially used as an airfield since it was established in 1921. It was further developed and heavily used in the 1950s and 1960s to service the Snowy Mountains Scheme.

The local planning scheme (*Cooma-Monaro Local Environmental Plan 2013*) has the site mapped as Zone IN1 General Industrial. Site identified details are summarised in Table 4.1.

Table 4.1 Site identification

Descriptor	**Site details**
Location	63 Polo Flat Rd, Polo Flat, NSW 2630
Lot and DP number	Part Lot 14 in DP 250029 and Lot 3 in DP 238762
Local council	Snowy Monaro Regional Council
Parish	Cooma
County	Beresford
Site owner	Snowy Hydro Limited
Site occupier	Snowy Hydro Limited
Current zoning	General Industrial
Past land use	Industrial, airfield
Site area	31.6 ha

Note: ha = hectare



Source: EMM (2019); FGJV (2019); Snowy Hydro (2019); DFSI (2017); ESRI (2019); GA (2011); LPMA (2011)

KEY

- ▭ The site
- ▨ Initial study area
- ▭ Cadastral boundary
- ● Soil or groundwater sampling location
- — Indicative site layout

Comparison between site boundary
and initial study area

Snowy 2.0
Contamination Assessment
Proposed Segment Factory
Figure 4.1

4.3 Surrounding land use

Table 4.2 summarises the land uses adjacent to and surrounding the site.

Table 4.2 Summary of surrounding land use

Direction from site	Feature	Distance from site
North	Airstrip and associated buildings	Adjacent
	Vacant land (Public Recreation Zone)	500 m
	Cooma Monaro Racetrack	1 km
South	Vacant land (Public Recreation Zone)	20 m
	Vacant land (Environmental Conservation Zone)	61 m
East	Abattoir	Adjacent (buildings 350 m)
	Surface water body	300 m
West	Mixed industrial sites (warehouses, automotive/metal recyclers, fabricators, transport, petrol retail)	Adjacent
	Council depot	Adjacent

4.4 Topography

The site lies on a gradual north-west facing slope, rising 7 m over 700 m. Elevations across the site range from approximately 820 m to 827 m Australian Height Datum (AHD).

4.5 Vegetation

The vegetation across the site consists of a mix of native and exotic grasslands. Native grasses align with the Natural Temperate Grassland of the South Eastern Highlands, described as a critically endangered ecological community listed under Commonwealth EPBC Act and NSW biodiversity legislation (NSW *Biodiversity Conservation Act 2016*). However, weeds, particularly the exotic African Lovegrass (*Eragrostic curvula*), are dominant and out-competing native grasses across the site, resulting in degradation of the vegetation. For further information please refer to the Biodiversity Development Assessment Report (EMM 2019).

4.6 Geology

The *Bega - Mallacoota 1:250,000 geological sheet* (Lewis and Glen 1995) outlines surface geological units found within the site. The surficial geology is mapped as Quaternary alluvium with small areas of Tertiary basalt on the western and southern edges.

The geological units within the site are described in Table 4.3.

Table 4.3 Geological units within the site

Symbol	Group	Unit name	Description
Qa	Quaternary	Undifferentiated	Alluvial and colluvial deposits: unconsolidated clay, silt, sand and gravel
Tv	Undifferentiated - Tertiary volcanics	Monaro Volcanics and Bondo Dolerite Member	Basalt, olivine basalt
Srca, Srcb	Bredbo Group (Silurian)	Colinton Volcanics	Sheared, medium-grained crystal-rich dacitic volcanics (dacite, andesite, rhyolite, tuff, limestone)

4.7 Soils

The site lies mostly on residual soils formed on lower slopes of basalt (Tv) and dacite (Src). There is also an unnamed drainage feature, with some minor alluvium, that flows through the site entering in the south-east corner and flowing in a north-westerly direction.

4.7.1 Soils formed from the Tertiary volcanics (basalt)

The majority of the site consists of long gently to very gently sloping residual basalt soils on lower slopes. The more elevated basalt soils are very shallow (~0.1 m deep) Tenosols (Ba-TE), before grading into shallow (0.1-0.5 m deep) Brown and Red Dermosols and Vertosols (BA-DE) and an area of moderately deep (0.5-1.0 m deep) Black Vertosols (Ba-VE) with areas of weak gilgai. Small pebbles of quartz and basalt and larger basalt cobbles occur in some areas. These basalt soils are non-saline and non-sodic. They generally have a moderate to high fertility.

4.7.2 Soils formed from the Silurian Colinton Volcanics (Bredbo Group)

The northern side of the drainage line and eastern hills consist of residual dacite soils on lower slopes. The soils in the south of this geology appear to be on a lithology that are more resistant to weathering resulting in shallower (<0.5 m deep) and rockier Red Kandosols and Dermosols of the Da-KA map unit. The northern section of this geology transitions into a flatter colluvial slope with deeper (>0.5 m) Red Kandosols and Ferrosols.

The soils generally have a gradational profile with topsoils of clay loam fine sandy to light clay grading into light medium clay subsoils. The brown to reddish brown topsoils are weakly structured before grading into red subsoils sometimes with polyhedral structure. The surface condition is often firm to hardsetting and there is evidence of sheet erosion over much of the unit. These soils have a pH ranging from slightly acid, through neutral to strongly alkaline, depending on the mineral content. These soils have very low salt contents and are non-sodic. Test results for Emerson were class 6 to 8, indicating the soil does not tend to disperse.

4.7.3 Soils formed from alluvial and colluvial deposits

The soils, located along the unnamed watercourse that crosses the site from south-east to north west, are generally deep (>1.0 m) and the upper (southern) areas of the soil unit appear to be dominated by basaltic source material with black cracking clays and minor gilgai. Further north on the alluvium there is a greater influence of dacite weathered material with lighter clays and less vertic properties. The soils have a uniform clay texture with dark greyish brown light medium clay surface over dark brown to black medium to medium heavy clay subsoils. In the southern section of the unit soils are heavier with vertic properties (eg slickensides and lenticular peds) and grade into browner slightly lighter soils further north. There are few to very few surface coarse fragments which also occur throughout the soil profile. The surface condition is self-mulching, cracking and crusting.

4.8 Surface water

The site is located within the upper reaches of the Cooma Creek catchment. Cooma Creek flows into the Numeralla River some 40 km downstream of Cooma.

There is one unnamed watercourse which passes through the south-eastern portion of the site and traverses the northern/western portion of Lot 14, being piped beneath the runway to the north of the site. Two further watercourses are located in the northern/eastern portion of Lot 14. All watercourses are known to have an ephemeral flow regime. Based on the topography of the area, surface water (when present) is likely to flow towards and through the site from neighbouring properties. Overland flow would likely continue in a northerly direction beyond the northern boundary of the site.

There are no water bodies on site. There are, however, several constructed farm dams on the adjoining abattoir to the east of the site.

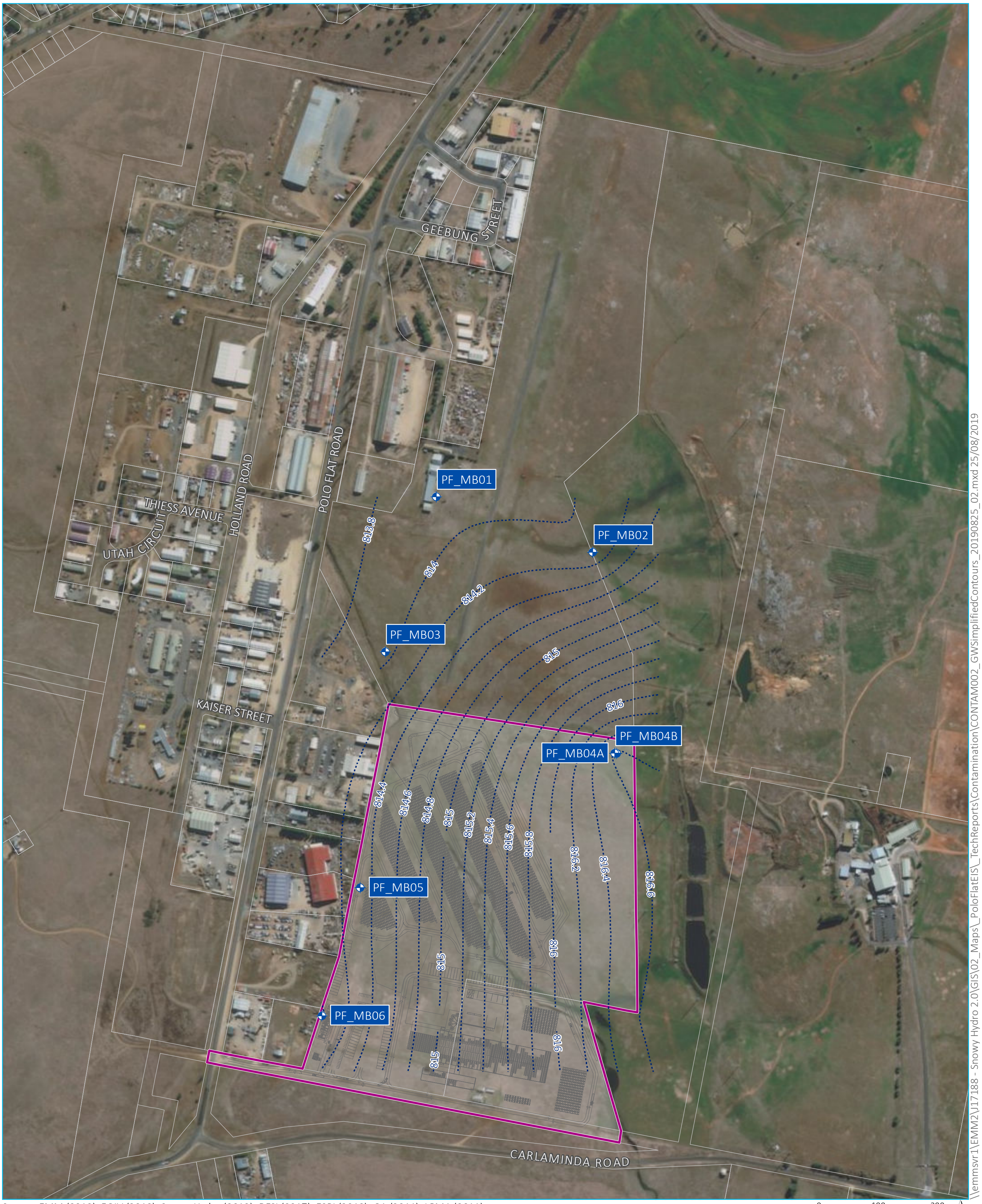
Topographic features of the site are presented in the Lotsearch Pty Limited (Lotsearch) report included at Annexure A.

4.9 Groundwater

A groundwater investigation was undertaken as part of this assessment. The investigation consisted of the installation and testing of a monitoring bore network targeting the shallow aquifer within the Tertiary Basalt and the overlying aquitard within the Quaternary Alluvium. The key findings of the drilling program are summarised as follows:

- the groundwater flow is to the west and north west governed by topography;
- the depth to the water table within the site and the initial study area ranges from 5 to 10 m below ground level (bgl). Groundwater contours and direction of flow are shown in Figure 4.2;
- the aquifer within the Tertiary Basalt is mostly unconfined and of low to moderate permeability. Its hydraulic conductivity ranges from 0.1 m/day in fresh to slightly weathered basalt to 10 m/day in highly weathered and/or fractured basalt;
- the alluvium is only present locally along the unnamed drainage feature that enters the site in the south-east corner and flows in a north-westerly direction. It consists of unconsolidated sandy silt and clay of very low permeability. Its hydraulic conductivity is in the order of 10^{-4} to 10^{-3} m/day; and
- the groundwater is fresh to slightly brackish and slightly alkaline.

A detailed groundwater drilling and completion report is attached in Annexure B.



\\emmsvr1\EMM2\J17188 - Snowy Hydro 2.0\GIS\02_Maps_PoloFlatEIS_TechReports\Contamination\CONTAM002_GWSimplifiedContours_20190825_02.mxd 25/08/2019

Source: EMM (2019); FGJV (2019); Snowy Hydro (2019); DFSI (2017); ESRI (2019); GA (2011); LPMA (2011)

0 100 200 m

GDA 1994 MGA Zone 55

N

KEY

▭ The site

— Indicative site layout

▭ Cadastral boundary

◆ Monitoring bore*

⋯ Inferred groundwater contour (m)

*MB04A (shallow) and MB04B (deep) are nested monitoring bores

Groundwater simplified contours

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Figure 4.2

snowy 2.0

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5 Site history and database review

5.1 Site history

A review of the site history and relevant databases was informed by the Lotsearch report (including historical aerial imagery) and information obtained during the site inspection. An overview is provided in the sections below. The Lotsearch report can be found in Annexure A.

It is noted that the historical searches were based on Lot 14 in DP250029 and did not include Lot 3 in DP 238762. Where information can be inferred for Lot 3 from the search results, for example, aerial photography, etc, this has been incorporated into the assessment.

5.1.1 Historic land ownership

Table 5.1 details the historical land ownership of Lot 14 in DP 250029. Lot 3 in DP 238762 is owned by Snowy Hydro Limited.

Table 5.1 Historical land ownership

Year	Owner
Lot 14 in DP 250029	
2019 – to date	Snowy Hydro Limited
2009 – 2019	Cooma Polo Flat Holdings Pty Limited (formerly Cooma (Polo Flat) Regional Airport Pty Limited)
1998 – 2009	Cooma (Polo Flat) Regional Airport Pty Limited
1950s - 1998	Snowy Mountains Hydro-Electric Authority
1921 – 1950s	Private owners

5.1.2 Aerial imagery

A review of historic aerial photography is presented below in Table 5.2.

Table 5.2 Aerial photographs

Date	Source	Interpretation
1960	NSW Department of Finance, Services & Innovation	A watercourse is visible, entering the site in the south eastern corner and traversing the central portion of the site and onto the northern portion of Lot 14. The radio transmitter compound is visible near the southern boundary (within Lot 3) The northern portion of Lot 14 appears to be cleared of vegetation and in the process of development. Rudimentary airstrip appears to have been developed in a north-south alignment, with a shorter cross runway visible in a north west-south east orientation. Industrial development is evident along the western boundary of the site with numerous buildings present, including a large wool store. Residential development to the far north-west of the site. The racetrack is visible to the north/north-east.
1967	NSW Department of Finance, Services & Innovation	The airstrip to the north of the site appears to have been further developed, being extended to the south and possibly sealed at the northern end. Gridded roads at the southern end of the airstrip are no longer visible. Signs of auto storage appear to the south-west. Surrounding areas to the west continue to be developed for commercial/industrial land use purposes. Further residential development to the north-west of the site. Several small aircraft are visible on the portion of Lot 14 to the north of the site. Two small, circular structures likely related to airfield operation appear on the northern and southern end of the airstrip.
1977	NSW Department of Finance, Services & Innovation	Airstrip appears to have been further developed with more defined runway areas visible. Surrounding areas to the west continue to be developed for commercial/industrial land use purposes. Further residential development to the north of the site. Development including a number of small buildings and surface water ponds are evident to the east of the site.
1985	NSW Department of Finance, Services & Innovation	There are no significant changes to the airstrip. Surrounding areas continue to be developed for commercial/industrial land use purposes. Further residential development to the north of the site. A large square building appears beyond the north-western boundary of the site.

Table 5.2 Aerial photographs

Date	Source	Interpretation
1998	NSW Department of Finance, Services & Innovation	No significant changes to the north-south runway were apparent, although it may have been resealed. The cross-runway appears less pronounced. Initial signs of material stockpiling on SMRC depot site adjacent to the western site boundary. The surrounding areas to the west continue to be industrially developed, including: Auto recycling facility prominent immediately adjacent to the south-western boundary of the site. Buildings consistent with the current Cooma-Monaro fire control centre are visible immediately adjacent to the north-west site boundary. Further residential development to the north-west of the site. Continued development to the east is apparent in the location of the current abattoir, including more buildings and additional surface water ponds.
2002	Google Inc.	Signs of increased material stockpiling on adjoining depot site. Soil erosion is apparent on to the north, east and south of the landing strip. Further residential development to the north-west of the site.
2009	Google Inc.	The sealed portion of the north-south runway appears to have been widened. Access tracks on each end of the landing strip are visible and extend to the property boundary on each side (north and south). Vegetation density appears to have increased across the site. Industrial development to the west has increased.
2011	Google Inc.	The airstrip access tracks are no longer visible. Site appears less vegetated. On-site vegetation suggests distinguishable water courses through the south-eastern area of the site.

5.1.3 Historical information

A search of historical records from the National Library of Australia Trove database identified a Canberra Times article reporting on an air crash to the south of the Polo Flat airstrip, adjacent the transmission tower located on Lot 3 in DP 238762. The crash occurred on 20 May 1976 and was documented to be approximately 100 m from the tower and 20 m from the airstrip. An estimated location is shown on Figure 6.1.

Potential contamination associated with the crash includes petroleum hydrocarbons from a release of aviation fuel. Due to the date of the crash, it is considered unlikely that aqueous film-forming foam (AFFF) containing per and poly fluoroalkyl substances (PFAS) would have been used to extinguish the fire. PFAS and AFFF were generally introduced in Australia for civilian use in the late 1970s (NSW Fire Brigade) and early 1980s (Airservices Australia).

5.2 Desktop contamination assessment

A desktop review of contamination registers was undertaken as part of the Lotsearch review (Annexure A). This search identifies records within Lot 14 in DP 250029 (the initial study area) and within a 1,000 m radius (buffer area). The buffer area is shown on page 6 in Annexure A. As a result, records within the site would be identified as part of this search, as it falls within the buffer area. The findings are summarised in Table 5.3.

Table 5.3 Desktop contamination assessment

Register	Description	Results	Description	Distance from site boundary
NSW EPA contaminated land: record of notices	NSW EPA's Contaminated Land Public Record register (under section 58 of the CLM Act) lists sites for which the EPA has issued regulatory notices under the CLM Act. The register includes the details of current and former regulatory notices issued.	No records for the site or buffer		
NSW EPA contaminated land: sites notified	NSW EPA's register of contaminated sites notified to the EPA under section 60 of the CLM Act, provides an indication of the management status of that particular site. Under section 60 of the CLM Act, properties must be registered with EPA if there is reason to suspect the land is contaminated, and one or more of the notification triggers in the duty to report guidelines exist at the site. Upon receipt of a section 60 notification, the EPA assesses the contamination status of the site to determine whether the contamination is significant enough to warrant regulation by the EPA.	1 record	Lowes Petroleum Cooma Depot and Service Station, 2-4 Sharp Street Cooma. EPA has completed assessment, no regulation under CLM Act required.	954 m west
NSW EPA: former gasworks register	The NSW EPA maintains a register of former gasworks as the operation of gasworks has left a legacy of soil and groundwater contamination. The major contaminants include tars, oils, hydrocarbon sludges, spent oxide wastes, ash and ammoniacal recovery wastes.	No records for the site or buffer		
National waste management site database	The National Waste Management Database (upgraded) presents the spatial locations of Australia's known landfills, waste transfer stations and a large number of waste reprocessing facilities. The data are a compilation of Australian, jurisdictional government, council and industry databases.	1 record	Site ID 661 Cooma Landfill - operational	965 m south
EPA PFAS (per- and poly-fluoroalkyl substances) Investigation Program	EPA state-wide PFAS investigation program to identify the use and impacts of legacy PFAS. These are a group of manufactured chemicals that are fire retardant, waterproof and stain-resistant that are very stable and can bioaccumulate.	No records for the site or buffer		
UPSS Environmentally Sensitive Zones	Environmentally sensitive areas (e.g. water course or protected area) which would be affected by the operation of Underground Petroleum Storage Systems (UPSS).	2 records	UPSS Sensitive Zones	>500 m south-west and >1,000 m south-east

Table 5.3 Desktop contamination assessment

Register	Description	Results	Description	Distance from site boundary
EPA Licensed Activities	Licensed activities regulated by the EPA under the POEO Act.	5 records	MonBeef Pty Limited – Rendering/fat extraction and slaughtering/processing animals	Adjacent, 0 m, east
			Australian Rail Track Corp Limited/John Holland Pty Limited – Railway systems activities	490 m, north-west
			SMRC – Cooma Landfill	965 m, south
EPA Delicensed and Former Licensed Activities	Former Licensed activities under POEO Act, now revoked or surrendered.	1 record	TransGrid – Hazardous, Industrial or Group A Waste Generation/Storage – Licence surrendered in 2001	991 m, north west
State Environmental Planning Policy	State Environmental Planning Policy Protected Areas	No records for the site or buffer		

6 Site inspection

An inspection of Lot 14 in DP 250029 and the adjacent depot was undertaken by an environmental scientist on 8 and 9 April 2019, and on 22 August 2019 for Lot 3 in DP238762, to visually assess the property for potential sources of contamination. Observations were made of adjacent properties from within the site boundary or from public roads, however as these properties are privately owned the presence of potential sources of contamination could not be confirmed.

In April 2019, EMM was accompanied by a representative from Robson Environment who conducted a materials assessment (MA) of the ground surface to assess the presence of suspected asbestos containing material (ACM) and any other potential hazardous building materials (HBM) in the airfield buildings (excluding Lot 3 in DP238762). The results of these investigations are described in Section 9 of this report.

As previously noted, the preferred location for the proposed segment factory changed over the course of this assessment. Consequently, the observations made during the inspection at Lot 14 in DP 250029 are not within the site (Lot 3 in DP238762). However, they are considered as part of the overall assessment. Observation locations are shown on Figure 6.1 and noted below.

- A 2,000 litre (L) aviation fuel above ground storage tank (AST) was observed in the central west section of Lot 14 in DP 250029 adjacent to the hangers (outside of the site). Refer to Photograph 6.1 and Photograph 6.2. The following observations were made:
  - The volume of fuel remaining in the tank could not be verified.
  - The tank is not bunded.
  - There was no visual evidence of staining, spills or surrounding contamination on the soil surface and no hydrocarbon odour was noted. However, grass beneath and in the vicinity of the AST was noted to be dead or stressed, indicating the potential for spills to have occurred in this area or for weed spraying to have occurred.

Photograph 6.1 2,000 L aviation fuel AST

Photograph 6.2 AST hazardous chemical labelling

- An underground storage tank (UST) was reportedly historically located under the concrete slab adjacent to the above-ground fuel tank. The old vents from the UST were located during the site inspection. According to SMRC records, the UST was removed and/or remediated in 2005. No technical reports relating to the removal, remediation or validation works were identified or made available. As such, it cannot be confirmed what method of decommissioning was used or whether backfill sands and surround residual material were remediated or validated.

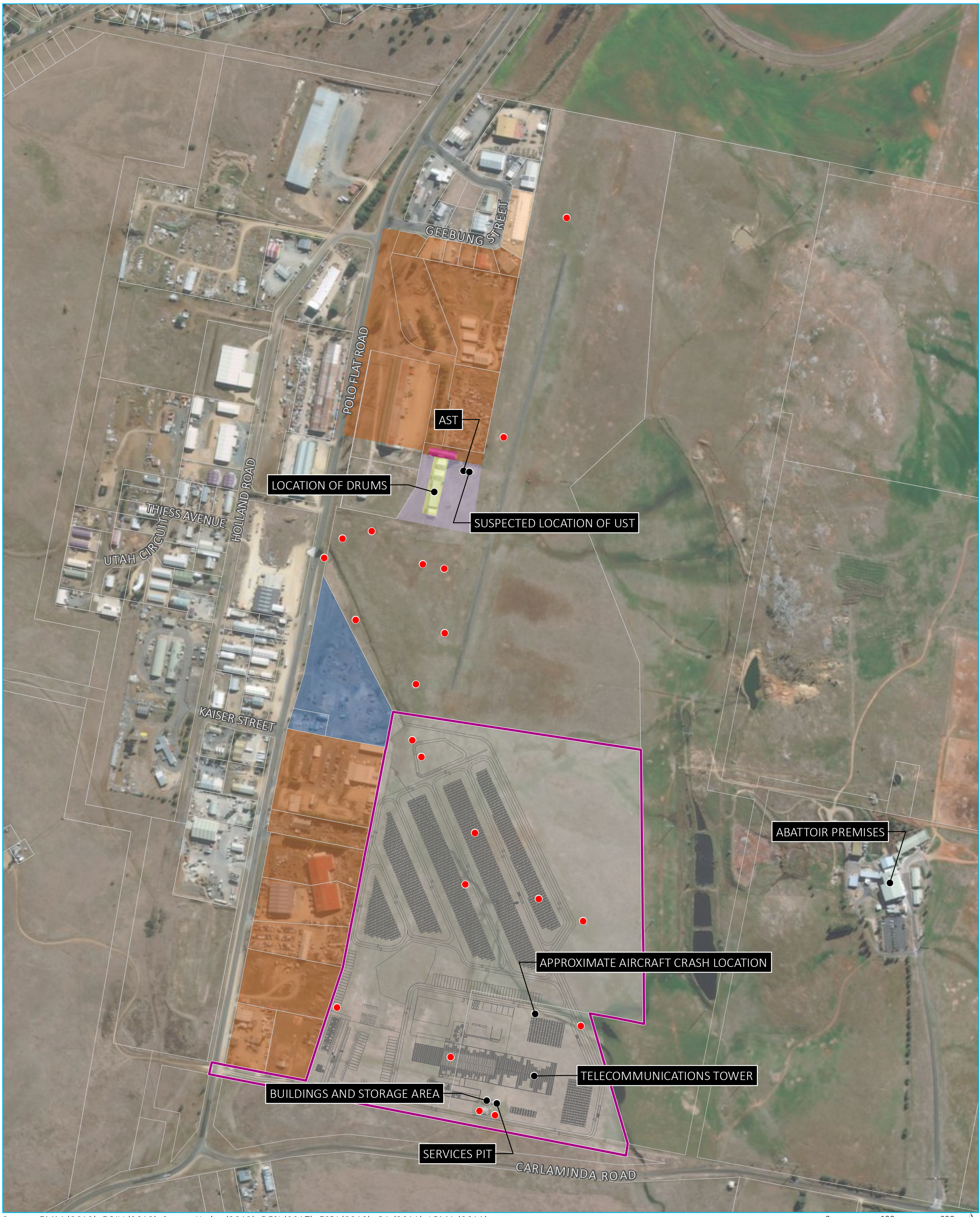
- Multiple 200 L aviation fuel barrels were observed in one of the hangers. Refer to Photograph 6.3. The following observations were made:

    - Residual fuel and other fluids were found in most of the barrels.

    - The drums were not stored within a bunded area.

    - Minor staining was observed on the ground surface near the drums. No evidence of significant contamination was observed and no hydrocarbon odours were noted.

    - The barrels were removed by Snowy Hydro following the site inspection.



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Source: EMM (2019); FGJV (2019); Snowy Hydro (2019); DFSI (2017); ESRI (2019); GA (2011); LPMA (2011)

KEY

- ☐ The site
- ☐ Cadastral boundary
- — Indicative site layout
- ● Site features
- ● Asbestos containing materials
- 🟪 Airfield administration building
- 🟨 Airfield hangars
- 🟦 Depot land
- 🟪 Hangars, administration building and fuel storage tanks
- 🟧 Industrial facilities (scrap and wreck yards)
- 🟧 NSW Fire Services

Site inspection observations

Snowy 2.0
Contamination Assessment
Proposed Segment Factory
Figure 6.1

snowy2.0

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Photograph 6.3 200 L aviation fuel drums

- A radio transmission tower was observed in the south-eastern portion of the site. The tower is of metal scaffold construction and held in place by wires fixed to concrete anchors. Anecdotal information suggests that old sleepers and concrete footings in the vicinity of the tower are likely to be associated with a previous tower that was replaced.

- Three small buildings were observed in the southern portion of the site (refer Photograph 6.4), comprising a derelict house, a transmission building and a demountable unit. It is understood that the buildings were associated with radio transmission and are no longer used. The house was unoccupied but noted to contain a large amount of furniture, boxes, cables, etc. The roof of the house comprised fibre cement sheeting and is likely to contain asbestos. The house was in a poor condition, evidenced by broken windows, flaking paint and loose wooden panels, at the time of the site inspection. The transmission building was noted to be in better condition than the house, however no observations could be made inside this building. The transmission building may also contain asbestos.

- The buildings were surrounded by a storage area with seven skip bins containing concrete, rubble and mattresses. Scrap metal, cables, wooden pallets and bathtubs were observed in the surrounding storage area. The surface of the area was grass covered and several fragments of potential ACM were observed near the entrance gate and the front entry of the house.

- It is understood that the demountable building, skips and scrap metal will be removed prior to the project commencing.

- A services pit (approximately 1 m by 2.5 m, depth unknown) was observed immediately to the north of the buildings and appeared to contain water (the lid of the pit could not be lifted).

- A dry creek bed was present in the north-eastern portion of Lot 3. Several broken glass bottles, pieces of clay pipe and fragments of potential ACM were observed in the creek bed (refer to Photograph 6.5).

Mixed industrial sites (warehouses, metal recyclers, scrap and wreck yards) were observed adjacent to the western boundary of the site. Refer to Photograph 6.6. Based on hydrogeological information and topography, these sites are located down hydraulic gradient from the site, and on-site migration of potential contamination is considered unlikely.

Photograph 6.4 Buildings and storage area in Lot 3 in DP 238762

Photograph 6.5 Potential ACM in creek bed, Lot 3 in DP 238762

Photograph 6.6 Adjacent industrial facilities

A council depot is located adjacent to the western boundary of the site. The depot is raised above natural ground by placement of fill materials, assumed to be a flood prevention measure. In some areas the ground level is raised up to 3 m from the surrounding natural ground levels (refer Photograph 6.7). A storage area containing drums and intermediate bulk containers (IBCs) was observed. The contents could not be confirmed during the inspection, but anecdotal information provided indicated the containers were likely used to store bitumen emulsion used in road paving.

Photograph 6.7 Property adjacent to western site boundary

An abattoir is located to the east of the site and topographically upgradient. Refer to Photograph 6.8. No indicators of contamination associated with this property were noted during the site inspection.

Photograph 6.8 Abattoir east of the site

7 Potential contamination summary

7.1 Potential contamination from historical and surrounding land use

Based on the site description, walk-over observations and review of site history, Table 7.1 summarises the potential contamination sources within the site and its surroundings.

Table 7.1 Potential existing contamination sources

Location	Feature	Potential source of contamination	CoPC
On-site (south)	Aircraft crash near southern radio transmitter	Aviation fuel	Petroleum hydrocarbons
On-site (south)	Buildings and storage area near radio transmitter	Hazardous building materials Spraying of herbicides/pesticides Storage of vehicles Storage of scrap metal and other wastes	Asbestos Lead Polychlorinated biphenyls (PCBs) Petroleum hydrocarbons Polycyclic aromatic hydrocarbons (PAHs)
On-site (general)	Presence of scattered fragments of ACM	Former and current building Imported fill material of unknown origins	Asbestos
Off-site (north)	Hangars and administration building	Above-ground storage tank and drums containing aviation gasoline	Petroleum hydrocarbons PAHs Asbestos Metals (lead)
Off-site (north)	Past airfield activities	Fuel and combustion products Storage and/or use of aqueous film forming foams (AFFF)	Petroleum hydrocarbons PAHs PCB PFAS
Off-site (west)	Multiple industrial facilities	Wreck and scrap yards Use of fuels, oils, lubricants and solvents	Petroleum hydrocarbons Metals PFAS
Off-site (west)	Material stockpiling	Material storage Unknown fill Container storage area	Petroleum hydrocarbons Metals PCB Pesticides Asbestos
Off-site (east)	Abattoir (former activities)	Wastewater Liquid waste disposal Livestock Carcass	Nutrients Bacterial contamination Organic and inorganic compounds Metals Soluble salt

7.2 Potential contamination - proposed segment factory

Based on our understanding of the construction and operation of the proposed segment factory, there are a number of activities that could potentially result in contamination, as summarised in Table 7.2.

Table 7.2 Potential contamination associated with construction and operation of facility

Location	Activity	Potential source of contamination	CoPC
On-site (south)	Demolition and removal of current buildings (no MA completed in southern areas)	Hazardous building materials	Asbestos Lead PCBs
On-site (general)	Earthworks: topsoil removal and stockpiling, excavation, benching and trenching	Fragments of ACM identified on surface soil across the site Dispersal of possible soil contaminants	Asbestos Metals Petroleum hydrocarbons PCBs PAHs PFAS
On-site (general)	Transport of fill/soil to/from site	Use of heavy vehicles	Petroleum hydrocarbons PAHs
On-site (general)	Establishment of site surfaces (concrete, asphalt, soil cement)	Use of heavy vehicles Importation of materials	Petroleum hydrocarbons PAHs
On-site (general))	General construction	Use of heavy vehicles Importation of materials	Petroleum hydrocarbons Metals
On-site (general)	Operations	Parking of vehicles Generation of waste Concrete batching plant Workshops Stockpiling of raw and processed materials	Petroleum hydrocarbons Metals PCB Pesticides Asbestos

As potential sources of contamination were identified through the site inspection and desktop data review, a limited intrusive sampling event (soil and groundwater) was undertaken to further evaluate the presence of contamination at the site.

It is noted that the intrusive investigation was limited to Lot 14 in DP 250029. The location of the proposed segment factory was reviewed and the southern portion of the site and surrounding land was preferred. Lot 3 in DP 238762 was subsequently added to the site after the intrusive works were completed. Section 12.2 details proposed additional sampling works to be completed within Lot 3 in DP 238762.

8 Field investigations

8.1 Data quality objectives

Data Quality Objectives (DQOs) is a process outlined in NSW EPA (2006) that supports the design of contamination assessments to achieve the desired outcomes. DQOs comprise seven steps through which the objectives of the assessment can be defined and refined to guide the collection of appropriate data. DQOs for this assessment are described in Table 8.1.

Table 8.1 Data Quality Objectives

DQO process	Comment
State the problem	It is proposed to construct a segment factory to support Snowy 2.0 on a portion of land located in Polo Flat, NSW. A site inspection and desktop review identified potential sources of contamination at the site. However, the nature and extent of contamination on the proposed site, that may impact on the development of the factory, is currently unknown.
Identify the goals of the investigation	• Understand current and historical site uses; • Confirm potential contamination sources, pathways and receptors; • Collect data on the contamination status of the site; • Assess the presence and nature of contamination; and • Inform any further work, remediation or risk management required at the site.
Identify the information inputs	Document and review current and historical uses to inform potential contamination sources based on field observations and desktop study. Soil and groundwater field results/observations and laboratory results to identify potential impacts and assess migration pathways.
Define the site boundaries	Lateral: the boundaries of the site, which is defined as the southern portion of Lot 14 in DP 250029 (known as the Polo Flat airfield) and Lot 3 in DP 238762. Vertical: the depth to which soil (0.1 and 0.5 m) and groundwater samples (3.5-18 m and 23-29 m) were collected. Temporal: data collected during the 2019 site investigation and interpretation of this data with reference to the history of the site as outlined in Annexure A.

Table 8.1 Data Quality Objectives

DQO process	Comment
Develop an analytical approach	Laboratories for sample analysis were National Association of testing Authorities (NATA) accredited for the requested analysis. The decision rules for the investigation were: • If the contaminant concentrations were less than the adopted investigation criteria, then any potential risk was assumed to be low and acceptable; • If the concentrations were equal to or greater than the criteria, then further assessment will be undertaken to assess any potential risk; and • asbestos –assessed for visible absence/presence in surface soils. The decision on the acceptance of the analytical data was made on the basis of the Data Quality Indicators (DQIs) as follows: • Precision: a quantitative measure of the variability (or reproducibility) of data; • Accuracy: a quantitative measure of the closeness of reported data to the “true” value; • Representativeness: the confidence (expressed qualitatively) that data are representative of each media present on-site; • Completeness: a measure of the amount of usable data from a data collection activity; and • Comparability: the confidence (expressed qualitatively) that data may be considered to be equivalent for each sampling and analytical event.
Specify limits on decision errors	This step involves specifying the acceptable limits on decision errors, which are used to establish performance goals for limiting uncertainties in the data. Some of the matters to consider include: • Determination of the possible range of the parameter of interest; • Identification of decision errors and formulation of the null hypothesis; • Specification of a range of possible parameter values where the consequences of decision errors are relatively minor; and • Assignation of probability values to points above and below the action level that reflect the tolerable probability for the occurrence of decision errors. Assessment of the suitability of the data through the assessment of DQIs, including precision, accuracy, representativeness, completeness and comparability (PARCC parameters).
Optimise the design	Optimisation of the data collection process were informed by a review of historical information and observations made at the time of the site inspection. As previously noted, sampling was undertaken to confirm the nature and extent of potential contamination. This data will be used to inform the contamination status of the site, recommendations for further sampling, or implementation of a management plan to address potential risk to identified receptors.

8.2 Site assessment criteria

The selection of site assessment criteria (SAC) for this investigation is summarised below in Table 8.2 (soil) and Table 8.3 (groundwater).

The adopted SAC are shown in the laboratory results tables in Annexure D of this report.

Table 8.2 Soil assessment criteria

Adopted criteria	Rationale and selection
Health Investigation Levels (HILs), Amended ASC NEPM (NEPC, 2013)	The ASC NEPM HILs provides a framework for the use of investigation and screening levels. The framework is applicable for assessing human health risk via all relevant pathways of exposure and covers a broad range of metals and organic substances. The site is owned by Snowy Hydro for industrial use. Thus, the analytical results from this investigation were compared to the ASC NEPM Commercial/Industrial D.
Health Screening Levels (HSLs), ASC NEPM	The ASC NEPM HSLs for petroleum compounds have been derived through consideration of risks to human health, with the main focus being on the vapour exposure pathway. The HSLs have been calculated using parameters that generally correspond to data available and as such aim to provide levels that are realistic rather than overly conservative. The site is owned by Snowy Hydro for industrial use. Thus, the analytical results from this investigation were compared to the ASC NEPM Commercial/Industrial D. Based on the clayey silt lithology encountered (Annexure C), silt was selected as the screening strata.
Management Limits, ASC NEPM	The ASC NEPM Management Limits for TRH are applied after the consideration of the relevant HSLs and Ecological Screening Levels (ESLs) as there are a number of policy considerations which reflect the nature and properties of petroleum hydrocarbons. There are Management Limits for specific soil types (coarse and fine) and land uses in the ASC NEPM. The Management Limits avoid or minimise the potential effects of the following and require consideration of site-specific factors to determine the maximum depth to which the limits should apply: • formation of observable light non-aqueous phase liquid; • fire and explosive hazards; and • effects on buried infrastructure e.g. penetration of, or damage to, in-ground services by hydrocarbons. The criteria for Commercial and Industrial in this guideline are considered relevant for the upper 2 m of soil.
Asbestos Screening Level, ASC NEPM	Asbestos screening levels are presented for asbestos containing material, friable asbestos, and asbestos fines. The site is owned by Snowy Hydro for industrial use. Thus, the analytical results from this investigation were compared to the ASC NEPM Commercial/Industrial D.
Ecological Investigation Levels (EILs), ASC NEPM	The ASC NEPM EILs have been developed for selected metals and organic substances and are applicable for assessing risk to terrestrial ecosystems. EILs depend on specific soil physicochemical properties and land use scenarios and generally apply to the top 2 m of soil. It is noted that ESLs take into consideration the depth of contamination, soil texture and age of the impacts. The site is owned by Snowy Hydro for industrial use. Thus, the analytical results from this investigation will be compared to the guideline for 'Commercial/Industrial'. As samples within the top 2 m bgs were analysed, these guidelines have been adopted for this investigation.

Table 8.2 Soil assessment criteria

Adopted criteria	Rationale and selection
ESLs, ASC NEPM	The ASC NEPM ESLs were developed to be protective of environmental concerns by determining the reasonable maximum exposure from site sources for a range of petroleum hydrocarbon compounds and TRH fractions commonly encountered on contaminated sites and are applicable for assessing risk to terrestrial ecosystems. ESLs broadly apply to coarse- and fine-grained soils and various land uses. They are generally applicable to the top 2 m of soil and 3 m in arid regions. The site is owned by Snowy Hydro for industrial use. Thus, the analytical results from this investigation will be compared to the ASC NEPM Commercial/Industrial D. As samples within the top 2 m bgs were analysed, these guidelines have been adopted for this investigation.
Aesthetic Issues	In accordance with the ASC NEPM, the aesthetic state of sites is required to be taken into consideration. Aesthetic issues generally relate to the presence of materials with a negligible risk or non-hazardous inert foreign material in soil or fill resulting from human activity. sites that have been assessed as being acceptable from a human health and environmental perspective may still contain such foreign material. An assessment of the site aesthetics requires consideration of the natural state of soil on any given site, and a comparison between it and the soil encountered during investigation works. In particular, soils on site should not exhibit discolouration (staining), a malodorous nature (odours) or abnormal consistency (rubble and asbestos). It is noted that from the *NSW Guidelines for NSW site Auditor Scheme* (2017) that odours but not staining (eg discoloration) are important to consider for commercial sites. *"While the decision-making process for assessing urban sites requires that contamination assessments address aesthetic issues, this does not extend to consideration of discolouration on commercial or industrial sites."* As such, aesthetic considerations were adopted throughout the fieldwork for soil sampling and noted in field notes when observed.
PFAS National Environmental Management Plan (NEMP, 2018)	National guidelines for three PFAS compounds (PFOS, PFHxS and PFOA) are presented in the PFAS NEMP 2018 to protect human health and the environment under a number of different exposure scenarios). Given the current and past use of the site as an active airfield, these guidelines have been adopted. Commercial/industrial land use has been selected as the most appropriate exposure scenario, applicable to the site in its current and proposed state.

Table 8.3 Groundwater assessment criteria

Adopted criteria	Rationale and selection
HSLs, ASC NEPM (2013)	The site is owned by Snowy Hydro for commercial use; therefore, the results have been compared to the NEPM 2013 screening levels (Commercial/Industrial - D). Lithology of the vadose zone is predominantly silty clay material (Annexure C); therefore, the adopted HSLs are as follows: • HSL D, CLAY, 2 to < 4 m; • HSL D, CLAY, 4 to < 8 m; and • HSL D, CLAY, +8 m.
Intrusive Maintenance Worker (Shallow Trench) Health Screening Levels, CRC CARE Technical Report No. 10, Part 2	In CRC CARE (2011), values are Non-Limiting (NL) for all three geologies (sand, silt, and clay) at all depths greater than 2 m. The HSL Intrusive Maintenance Workers (Shallow Trench) were adopted despite values being non-limiting.
Australian and New Zealand Guidelines for Fresh and Marine Water Quality (ANZG, 2018)	Given the site and surrounding landscape and water courses have been modified by human activity, the following guideline is applicable: ANZG Freshwater 95% toxicant - slightly to moderately disturbed systems.
PFAS National Environmental Management Plan (NEMP, 2018)	National guidelines for three PFAS compounds (PFOS, PFHxS and PFOA) are presented in the PFAS NEMP 2018 to protect human health and the environment under a number of different exposure scenarios. Given the current and past use of the site as an active airfield, these guidelines have been adopted. Guidelines values for drinking water, recreational water use and protection of 95% species in freshwater have been used as screening criteria in this assessment. The PFAS NEMP 2018 notes that for bioaccumulate contaminants, the value for the protection of 99% of species may be adopted. However, given the industrial nature of the site and the surrounding area and the distance to the nearest unmodified watercourse, the use of the 95% protection value is considered suitable for this assessment.

8.3 Quality assurance/quality control (QA/QC)

Analytical data validation is the process of assessing whether the data is compliant with method requirements and project specifications. The primary objective of this process is to ensure that data of known quality are reported and to identify if data can be used to fulfil the overall project objectives.

The adopted data validation process is based upon the following data validation guidance documents published by the National Environmental Protection Council (NEPC) and the United States Environmental Protection Agency (USEPA):

- ASC NEPM;
- USEPA, October 2002, *USEPA Contract Laboratory Program National Functional Guidelines for Inorganic Data Review* (USEPA, 2004); and
- USEPA, October 1999, *USEPA Contract Laboratory Program National Functional Guidelines for Superfund Organic Methods Data Review* (USEPA, 2008).

The process involves a review of analytical procedure compliance and the assessment of the accuracy and precision of analytical data from a range of quality control measurements, generated from both field sampling and analytical programs.

The laboratory analytical results are presented in Annexure D and the laboratory reports are included in Annexure E. Laboratory specific elements that have been checked and assessed for this project include:

- preservation and storage of samples upon collection and during transport to the laboratory;
- sample holding times;
- use of appropriate analytical procedures;
- limits of reporting;
- frequency of conducting quality control measurements;
- rinsate and field blank results;
- laboratory blank results;
- field duplicate results;
- laboratory duplicate results;
- matrix spike results;
- surrogates spike results; and
- occurrence of apparently unusual or anomalous results, eg laboratory results that appear to be inconsistent with field observations or measurements.

8.3.1 Field QA/QC

Samples were collected in laboratory provided sample containers, with appropriate preservation. Samples were collected and sent to the laboratory under appropriate chain-of-custody protocols.

The field QA/QC procedures used to establish accurate, reliable and precise results included:

- calibration of equipment;
- submitting laboratory samples within holding times;
- keeping samples chilled;
- wearing disposable gloves during sampling which are changed between sample locations; and
- decontamination of equipment before sampling and between each location.

An assessment of laboratory and field data validation is provided in Annexure F.

8.4 Soil investigations

8.4.1 Methodology

Soil sampling was undertaken in general accordance with the National Environment Protection Council Schedule B(1*) Guideline on Investigation Levels for Soil and Groundwater* and Schedule B(2) *Guideline on site Characterisatio*n (NEPC 2013).

The soil investigation comprised:

- investigation of areas where contamination was visually identified during the site inspection, or suspected due to observed sources, and areas of interest for the project where development (including intrusive works) may occur, including:
    - the area around existing hangers and fuel storage area where offices and an access road were originally proposed and where potential sources of contamination were identified; and
    - the southern part of Lot 14 where the segment factory is proposed. It is noted that no investigations were undertaken in the south-eastern portion of the site (Lot 3 in DP 238762) due to changes to the proposed site layout during the course of the assessment.
- collection of 31 soil samples at 22 locations to a maximum depth of 0.5 m within the identified areas of environmental concern using a decontaminated hand trowel for surface samples, and decontaminated hand auger for subsurface samples;
- soil logging with reference to the United Soil Classification System (USCS);
- field screening of each soil sample for volatile organic compounds (VOCs) using a photoionisation detector (PID); and
- photographic records of each sample location.

8.4.2 Soil sampling location and analyses

Samples were analysed by SGS and EnviroLab laboratories for the suite of analytes listed in Table 8.4.

Table 8.4 Analytical suite

Reference	Analytes
Standard metals	arsenic, cadmium, chromium, copper, lead, mercury, nickel, zinc
Asbestos	asbestos fibres, ACM
Organics	Total Recoverable Hydrocarbons (TRH), Benzene, Toluene, Ethylbenzene, total Xylenes and Naphthalene (BTEXN) and Polycyclic Aromatic Hydrocarbons (PAH)
OCP/OPP	organochlorine pesticides (OCP) and organophosphorus pesticides (OPP)
PCB	total polychlorinated biphenyls (PCBs)
PFAS	per- and poly-fluoroalkyl substances (PFAS)

Sampling locations and analyses are presented in Figure 8.1 and Table 8.5.

Table 8.5 Soil sampling location rationale and analyses

Soil ID	Location/rationale	Depth of sample (m bgl)	Analytical suite*
S01	In front of hangar (east)	0.1	Suite 2
S02	In front of hangar (east)	0.1 & 0.5	Suite 3
S03	In front of hangar (east)	0.1	Suite 1
S04	Behind hangar (west)	0.1 & 0.5	Suite 1
S05	Potential fill behind hangar (west)	0.1 & 0.5	Suite 3
S06	5 m in front of hangar (east)	0.1 & 0.5	Suite 1
S07	10 m in front of hangar (east)	0.1	Suite 3
S08	5 m in front of hangar (east)	0.1 & 0.5	Suite 3
S09	10 m in front of hangar (east)	0.1	Suite 1
S10	Potential fill behind hangar (west)	0.1	Suite 2
S11	Adjacent to AST and fuelling slab	0.1 & 0.5	Suite 3
S12	West of fuelling slab	0.1	Suite 3
S13	Characterise development area	0.1	Suite 1
S14	Characterise development area	0.1 & 0.5	Suite 3
S15	Characterise development area	0.1	Suite 1
S16	Characterise development area	0.1	Suite 3
S17	Characterise development area	0.1	Suite 1
S18	Characterise development area	0.1	Suite 3
S19	Characterise development area	0.1 & 0.5	Suite 3
S20	Characterise development area	0.1 & 0.5	Suite 3
S21	Characterise development area	0.1	Suite 1
S22	Characterise development area	0.1	Suite 1

Notes: m bgl = metres below ground level.
*Suite 1 - standard metals, TRH/BTEXN (11 samples).
*Suite 2 - standard metals, TRH/BTEXN, asbestos (2 samples).
*Suite 3 - standard metals, TRH/BTEXN, asbestos, PCBs, PAH, pesticides, PFAS (18 samples).

8.5 Groundwater investigations

8.5.1 Drilling program

The National Environment Protection Measure Schedule B(1) *Guideline on Investigation Levels for Soil and Groundwater* and Schedule B(2) *Guideline on site Characterisation* (NEPM 2013) recommend that groundwater site investigations require as a minimum:

- one upgradient monitoring bore to establish the quality of groundwater entering the site (one for each aquifer or geological unit of interest); and

- two or three monitoring bores to monitor groundwater quality immediately downgradient and also lateral to each contaminant source (for each aquifer or geological unit of interest).

Groundwater monitoring bores were drilled, installed, water levels and field parameters were measured, and samples were collected at the following locations:

- three upgradient monitoring bores targeting different geological units: MB02 (single bore) and MB04A and MB04B (nested bores); and
- four downgradient monitoring bores located near potential contamination sources or at the down-gradient boundary of the site: PF_MB01 (hangar and UST), PF_MB03 (site boundary), PF_MB05 (site boundary) and PF_MB06 (site boundary).

The general monitoring bore information is provided in Table 8.6.

Table 8.6 General bore information

Bore ID	**MGA coordinates[1]**		**Ground Elevation[2]**	**Drilled depth**	**Screened interval**	**Screened formation**	**Screened lithology**
-	mE	mN	m AHD	m bgl	m bgl	-	-
PF_MB01	693,090	5,988,456	820.0	13	5–11	Tertiary Basalt	Fractured basalt
PF_MB02	693,354	5,988,363	823.8	19	12–18	Tertiary Basalt	Slightly fractured, fresh basalt
PF_MB03	693,004	5,988,195	821.0	11	3.5–9.5	Tertiary Basalt	Fractured/fissured basalt
PF_MB04A	693,394	5,988,023	825.4	13.5	6.5–12.5	Quaternary Alluvium	Unconsolidated sandy silt and clay
PF_MB04B	693,391	5,988,024	825.3	30	23–29	Tertiary Alluvium	Weakly consolidated silty clay
PF_MB05	692,962	5,987,797	821.0	12.5	5–11	Tertiary Basalt	Fractured/fissured basalt
PF_MB06	692,897	5,987,581	822.3	18	11–17	Tertiary Basalt	Slightly weathered to fresh basalt

Notes: 1. coordinate system Zone 55 GDA 94
2. Drone surveyed
m AHD: metres Australian Height Datum
m bgl: metres below ground level

Further information on the drilling program and aquifers characterisation is provided in the drilling and completion report prepared separate to this document (EMM, 2019) attached in Annexure B.

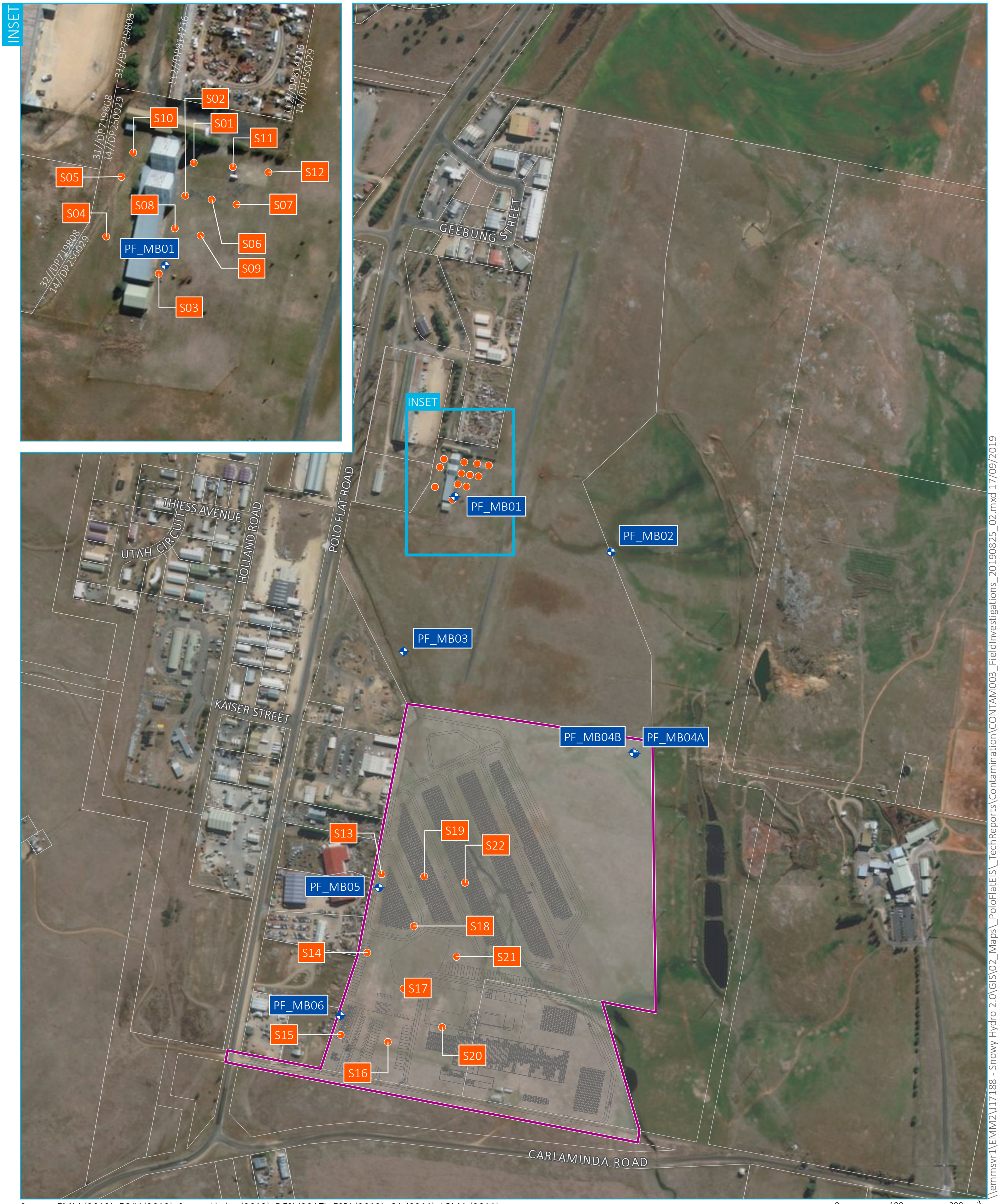
8.5.2 Groundwater sampling and analyses

Groundwater sampling was undertaken using single use plastic bailers. Physico-chemical parameters (including pH, temperature and electrical conductivity (EC)) were measured during purging to monitor water quality changes, and to indicate representative groundwater suitable for sampling and analysis.

Groundwater samples were analysed by ALS laboratories for the suite of analytes shown in Table 8.7.

Table 8.7 Analytical suite

Reference	Analytes
Physico-chemical properties	pH, Electrical Conductivity (EC), Total Dissolved Solids (TDS)
Total Metals	aluminium, antimony, arsenic, barium, beryllium, cadmium, chromium, cobalt, copper, iron, lead, manganese, molybdenum, nickel, selenium, silver, zinc, mercury
Asbestos	asbestos
Organics	TRH, BTEXN and PAH
OCP / OPP	OCP/OPP
PCB	PCB
PFAS	PFAS



Source: EMM (2019); FGJV (2019); Snowy Hydro (2019); DFSI (2017); ESRI (2019); GA (2011); LPMA (2011)

0 100 200 m
GDA 1994 MGA Zone 55
N

KEY

▭ The site

▭ Cadastral boundary

● Soil sampling location

⯐ Monitoring bore*

— Indicative site layout

Field investigations: Soil and groundwater sampling locations

Snowy 2.0
Contamination Assessment
Proposed Segment Factory
Figure 8.1

*MB04A (shallow) and MB04B (deep) are nested monitoring bores

9 Results

9.1 Soil

9.1.1 Subsurface soil conditions

The lithology is presented in the borelogs in Annexure C. The highest PID reading recorded was 1.8 parts per million (ppm), indicating negligible vapour concentrations. The samples were dry to moderately moist. No staining or odours were noted.

Soil surrounding the administration buildings (S01-S12) generally was comprised of the following:

- brown, dry, clayey silt, containing organic matter to a depth of 0.1-0.3 m; and
- dark brown, moist clay with high plasticity to a depth of 0.5 m.

Soil at the southern end of the airstrip (S13-S22) generally was comprised of the following:

- brown, dry, clayey silt, containing organic matter to a depth of 0.1-0.3 m; and
- dark brown, moist clay with high plasticity to a depth of 0.5 m.

9.1.2 Laboratory results

31 soil samples were collected at 22 locations as presented above. Laboratory results for contaminants in soil are presented in Annexure D and laboratory reports are included in Annexure E.

The key findings of the laboratory results are summarised in Table 9.1.

Table 9.1 Soil laboratory results summary

Analytes	Results
Asbestos	Absent in all samples
BTEXN	Less than laboratory limits of reporting (LOR) in all samples
OCP/OPP	Less than the laboratory LOR in all samples
Metals	Greater than the laboratory LOR in all samples (for one or more metals) but less than the adopted SAC
PFAS	Greater than the laboratory LOR in 12 samples but less than the adopted SAC
TRH	Greater than the laboratory LOR in 3 samples but less than the adopted SAC
PAH	Greater than the laboratory LOR in four samples but less than the adopted SAC
PCB	Greater than the laboratory LOR in one sample but less than the adopted SAC

9.2 Groundwater

9.2.1 Hydrogeological conditions

The key findings of the groundwater investigation are:

- the groundwater flow is to the west/north west, governed by topography;
- the depth to the water table ranges from 5 to 10 m bgl;
- the aquifer within the Tertiary Basalt is mostly unconfined and of low to moderate permeability. Hydraulic conductivity ranges from 0.1 m/day in fresh to slightly weathered basalt to 10 m/day in highly weathered and/or fractured basalt;
- alluvium is present along the unnamed drainage feature that flows through the site entering in the south east corner and flowing in a north westerly direction. It consists of unconsolidated sandy silty clay flow permeability with a hydraulic conductivity in the order of 10^{-3} m/day; and
- groundwater is fresh to slightly brackish and slightly alkaline.

9.2.2 Laboratory results

Laboratory reported results of groundwater are tabulated in Annexure D and summarised in Table 9.2.

Table 9.2 Groundwater laboratory results summary

Analytes	Results
Asbestos	Absent in all samples
BTEXN	Less than laboratory limits of reporting (LOR) in all samples
OCP/OPP	Less than the laboratory LOR in all samples
Metals	Concentrations of metals including aluminium, chromium, copper, iron, lead, nickel and zinc greater than the laboratory LOR were reported in all shallow bores, with concentrations greater than the adopted SAC, where applicable, in MB01, MB03 (except lead), MB04A (except copper and nickel), MB05 (except copper and lead) and MB06.
PFAS	Greater than the laboratory LOR in 3 samples (MB03, MB05 and MB06) from the western site boundary, but less than the SAC for human health and ecological protection
TRH	Greater than the laboratory LOR in 3 samples but less than the adopted SAC
PAH	Greater than the laboratory LOR in four samples but less than the adopted SAC
PCB	Greater than the laboratory LOR in one sample but less than the adopted SAC

9.2.3 Metals in groundwater

With the exception of MB01, total metals concentrations recorded at all shallow bores were generally consistent, including MB04A and MB02, located up-gradient on the eastern boundary of the initial study area. This suggests the concentrations reported are likely to be representative of ambient or background conditions. However, the potential for an off-site source of metals contamination to the east cannot be precluded based on the results.

Deep bore MB04B reported significantly lower concentrations of metals suggesting that the concentrations in the shallow bores may be associated with the mineralogy of the surface soils, or presence of contamination that has not reached the deeper part of the aquifer given its low vertical hydraulic conductivity.

Samples taken at MB01, located near an abandoned hangar and a former UST, reported metals concentrations, particularly iron, aluminium, cobalt copper and nickel, approximately an order of magnitude higher than all other locations. These results potentially indicate a local contamination source(s) in this area. This is not unexpected given the presence of infrastructure and buildings in the vicinity of MB01.

9.3 Materials

Scattered clusters of ACM such as sheet debris and pipe fragments were found at 19 separate locations across the initial study area during the inspection of 8 and 8 April 2019, of which 11 of the locations were sampled and subsequently analysed. All 11 samples contained non-friable asbestos and it can be inferred that fragments at the other eight locations contain asbestos.

The ACM was observed scattered across the surface and is not considered likely to be associated with any notable fill material. However, there is a potential for ACM to be present below the surface of the site in pockets of fill material or where earthworks or erosion has caused disturbance to the soil.

The MA report undertaken by Robson Environmental is included in Annexure G.

Fragments of potential ACM were also observed during the inspection of Lot 3 in DP 238762 on 22 August, near the entrance gate, around the house and in the dry creek bed on the eastern area. These fragments may be associated with the weathering of buildings on site and/or being washed onto the site during periods of water flow in the creek.

9.4 Hazardous materials

A non-intrusive MA was undertaken in the buildings on Lot 14 only. A non-intrusive MA was not undertaken in the buildings on Lot 3.

The survey involved a visual inspection of accessible, representative, construction materials and the collection and analysis of sampled materials suspected of being potentially hazardous to human health. During the walkover, scattered clusters of ACM fragments were observed in 19 separate locations across the site, of which 11 of the locations were sampled and subsequently analysed (Robson 2019). The key findings of this investigation are:

- ACM was assumed to be present in both the administration building (light wiring in ground floor toilets, presumed to be friable) and the hangars (ground floor electrical switchboard, presumed non-friable) (refer to Figure 6.1). Due to both being live, confirmatory sampling could not be undertaken.
- No asbestos was detected in 24 samples collected throughout the buildings, including from window sealants, walls, ceilings and floors.
- Lead paint was identified throughout the internal and external surfaces of the administration building and the walls, trims and structural beams of the hangars.
- Synthetic Mineral Fibre batts were found in the office ceiling space and the hot water heater of the administration building's laundry.
- PCB containing capacitor units were identified within the fluorescent light fittings.

- Two air conditioning and refrigeration units were identified as containing ozone depleting substances.

It is noted that the buildings subject to the MA on Lot 14 are not located within the site. The MA report is included in Annexure H.

As noted above, the house on Lot 3 in DP 238762 was observed to have a fibre cement sheeting roof, which is consider likely to contain asbestos.

9.5 Summary

The results of the intrusive investigation suggest there is no significant contamination in the areas assessed, that would preclude the development of the proposed segment factory.

Asbestos was not reported in any soil samples analysed, however, it is noted that the MA identified fragments of ACM on the surface at multiple locations. The potential for fragments of ACM to weather and cause asbestos contamination of soils cannot be precluded and management measures will be required for construction of the proposed segment factory.

No PFAS was reported in soil or groundwater at concentrations greater than the adopted SAC. PFAS was reported in soil in the vicinity of the airfield buildings and in the south-western corner of the site, while concentrations in groundwater were reported above the LOR in three monitoring wells at the western site boundary. There are multiple potential sources of PFAS contamination in the vicinity of the site. However, at the concentrations reported PFAS is not considered to present an unacceptable risk to human health or the environment and no immediate remediation or management is considered necessary. In the event that groundwater is intersected during the construction works and requires storage and/or off-site discharge (for example, dewatering of excavations), further testing should be undertaken prior to release to confirm the results of this preliminary assessment. Water with elevated concentrations of PFAS (i.e. greater than the adopted SAC) may require treatment or disposal at an appropriately licenced waste facility.

Hydrocarbons were reported in surface soil at two locations near the airfield buildings, at concentrations less than the SAC. At one of these locations (SB05) a deeper sample did not report concentrations of hydrocarbons greater than the laboratory LOR. Additionally, groundwater samples did not exhibit any sign of hydrocarbon contamination suggesting the hydrocarbons remain within the superficial soil layer and have not migrated to the water table.

Concentrations of total metals were reported in the groundwater samples analysed, with concentrations greater than the SAC for metals including aluminium, chromium, copper, iron, lead, nickel and zinc at one or more locations. However, due to the disturbed nature of the surrounding environment and the distance to the nearest notable surface water receptor, this is not considered to present an unacceptable risk. Metals concentrations were generally consistent in shallow groundwater across the site, including the up-gradient bores. Higher concentrations of metals were reported in MB01, in the vicinity of the old hangar, indicating a potential localised source of metals contamination in this area. No metals were reported in soil samples at concentrations greater than the adopted soil SAC.

A preliminary conceptual site model (CSM) has been developed to identify source-pathway-receptor linkages to human or environmental receptors. The preliminary CSM is discussed in more detail in Section 10 of this report.

10 Preliminary conceptual site model

10.1 Introduction

A preliminary CSM is a qualitative description of the mechanisms by which potential and/or complete exposure pathways exist between known or potential sources of property impacts, and human or environmental receptors.

In order for human or ecological receptors to be exposed to a chemical contaminant at the site, a complete exposure pathway must exist. An exposure pathway describes the course a chemical or physical agent takes from the source to the exposed individual and generally includes the following elements (USEPA, 1989):

- a source and mechanism of chemical release;
- a retention or transport medium (or media where chemicals are transferred between media);
- a point of potential contact with the contaminated media; and
- an exposure route (eg ingestion, inhalation) at the point of exposure).

Where one or more of the above elements is missing, the exposure pathway is considered to be incomplete and there is therefore no direct risk to the receptors. Where this is identified, the exposure pathway does not warrant further assessment.

10.2 Sources of contamination

Potential sources of contamination at the site have been refined based on the outcomes of the field investigation and are summarised below. Contamination identified in the northern portion of Lot 14 has not been considered in development of the preliminary CSM as this area is not part of the site. Sources of contamination within the site are considered to comprise:

- topsoil, due to identification of ACM fragments across the surface of the site (including potential ACM in Lot 3 in DP 238762);
- groundwater, where concentrations of metals were reported to be greater than the SAC for the protection of ecosystems (95%);
- buildings and the storage area in Lot 3 in DP 238762; and
- the site of the potential air crash in southern portion of the site (potential contaminants include TRH, but PFAS considered unlikely due to date of crash).

10.3 Potential receptors and pathways

Sensitive human and ecological receptors identified for the site include:

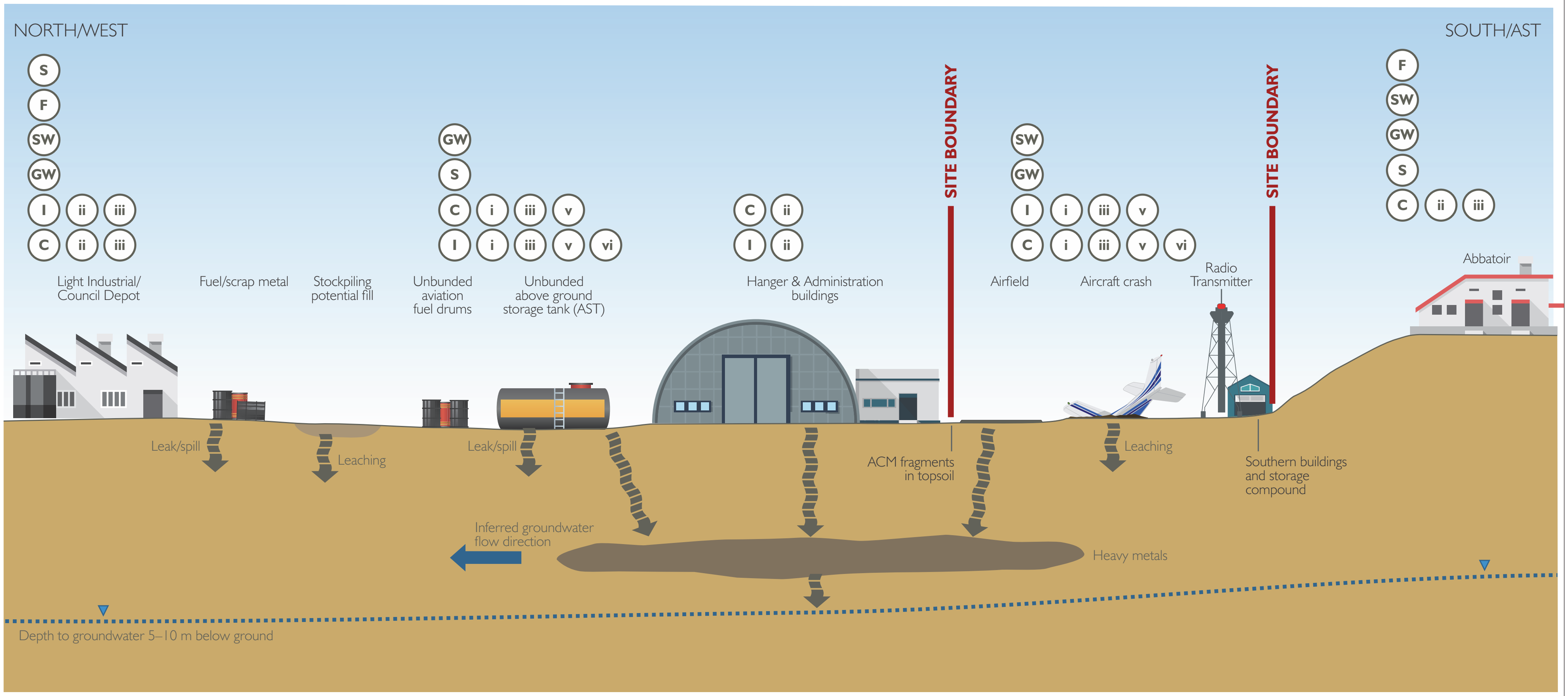
- intrusive (i.e. ground excavation) workers (on-site and off-site);
- commercial workers (on-site and off-site);
- soil ecosystem;

- flora and fauna on-site and down gradient;
- surface water and sediment ecosystems; and
- local groundwater system.

Pathways between the potential sources of contamination, without appropriate management controls, and these sensitive receptors include:

- dermal contact between workers and contaminated soils and surface water and/or groundwater: could potentially occur during earthworks (eg excavation of contaminated soil), topsoil removal, stockpiling and use;
- ingestion of contaminated soil and/or groundwater by segment factory personal or persons working in the vicinity: unlikely under the current and proposed land use, with use of groundwater and surface water for water supply or irrigation not expected;
- inhalation of dust and/or asbestos fibres: unlikely during the segment factory operation but could occur during construction phases, for example during excavation and surface levelling activities, or if contaminated topsoil is reused during site development;
- impact to ecological receptors via migration of contaminated water: rainfall leaching through the surface soils could enter the groundwater system and contaminated groundwater discharge into water courses, resulting in a potential impact to ecosystems; and
- migration of impacted sediment and surface water runoff may contain contaminants of concern and discharge into the nearby watercourses.

The preliminary CSM schematic is presented in Figure 10.1.



Key

▾	Groundwater level

Receptors

I	Intrusive (ground excavation) workers
C	Commercial workers
S	Soil ecosystem
F	Flora and fauna
SW	Surface water and sediment ecology
GW	Groundwater ecosystem

Pathways

i	Dermal contact and incidental ingestion of soil
ii	Inhalation of dust from soil
iii	Dermal contact and incidental ingestion of surface water/groundwater
iv	Inhalation of soil/groundwater vapours in indoor air
v	Inhalation of soil/groundwater vapours in outdoor air
vi	Inhalation of soil/groundwater vapours within a trench

U:\Jobs\J17188 - Snowy Hydro\Water\Groundwater\Graphics

EMM
creating opportunities

Conceptual Site Model
Polo Flat
Contamination Assessment
Figure 10.1

10.4 Risk assessment

The risk criteria considered are outlined in Table 10.1. Table 10.2 summarises the current land use and activities associated with the proposed segment factory and the anticipated level of risk associated with each activity from a contamination perspective.

Table 10.1 Preliminary qualitative risk matrix

Consequence	**Likelihood of contamination to be present or to occur**			
	Very unlikely to be present at concentrations above the relevant assessment criteria and limited in extent	Potentially present at concentrations above the relevant assessment criteria and limited in extent	Potentially present at concentrations above the relevant assessment criteria and widespread	Known to be present at concentrations above the relevant assessment criteria and widespread
No or unlikely exposure pathway for human or ecological receptors either now, during, or post construction	Low	Low	Medium	Medium
Complete exposure pathway for human or ecological receptors likely to be present either now, during, or post construction	Low	Medium	High	High
Complete exposure pathway for human or ecological receptors present either now, during, or post construction	Medium	Medium	High	High

Table 10.2 Assessment of impacts and contaminants of concern – construction phase

Project element	CoPC	Description	Likelihood of contamination to be present or occur	Consequence	Potential contamination risk	Potential contamination risk following remediation/management
Construction phases						
Demolition and removal of buildings and facilities	Asbestos, hydrocarbons, metals	Potential ACM (and other hazardous building materials) at the Lot 3 buildings, given the age of the buildings and confirmed presence of ACM in other buildings at the airfield. Their removal will require management plans.	Potentially present in existing buildings	Likely exposure pathway for human receptors. Management plan and appropriate measures required.	Medium	Low
Removal, storage and use of topsoil	Asbestos, metals, PAHs, hydrocarbons, PFAS	Construction activities would include clearing, removal of topsoil and vegetation (topsoil excavated would be stockpiled on site for later use, where possible). Fragments of ACM were identified on surface soils across the site. PFAS, PAHs, hydrocarbons and metals were found to be present within the topsoil but at concentrations less than the adopted SAC. All removal, stockpiling and use of possibly contaminated topsoil will therefore require appropriate management and mitigation (e.g. use of appropriate personal protective equipment and bunding of the stockpile).	ACM was present at the site surface. Other contaminants present but at concentrations below health and ecological criteria.	Likely exposure for human receptors. An emu-bob to clear surface fragments of ACM will be required prior to disturbance of topsoil. Topsoil will then be excavated and stored with appropriate controls to minimize exposure. Topsoil will require validation before being reused on-site.	Medium	Low

Table 10.2 Assessment of impacts and contaminants of concern – construction phase

Project element	CoPC	Description	Likelihood of contamination to be present or occur	Consequence	Potential contamination risk	Potential contamination risk following remediation/management
Earthworks	Metals, PAHs, hydrocarbons, asbestos, PFAS	Excavation will be carried out at the site to provide level surfaces, establish the access road and create the required trenches for drainage. Excavated material could be reused on-site for filling and compaction. Field investigations showed high concentrations of metals in the soil and groundwater, potentially hazardous for human and ecological receptors. Concentrations of other contaminants in soil (PFAS, PAHs, hydrocarbons and asbestos) were not reported above the adopted SAC. All earthworks will require appropriate management and mitigation measures. Site preparation and emplacement of material will restrict the pathway to ecological receptors. Appropriately designed surface water diversion systems should be installed to prevent erosion and manage infiltration through the stockpiles during rain and flooding events. The final design of the stockpiles should include appropriate bunding to limit pathways to ecological receptors.	Known to be present but at concentrations below health and ecological criteria in soil. No data for south eastern portion of site.	Likely exposure pathway for potential ecological receptors. Risks of exposure pathways for human receptors in Lot 3 in DP 238762. Targeted sampling to be undertaken.	Medium	Low
Vehicle use and storage	Hydrocarbons, PAHs	Contamination may occur due to spills or leaks of fuels, oils, etc from vehicles used in the construction of the site.	Unlikely, unlikely to occur in significant volumes.	Unlikely exposure pathway for human or ecological receptors.	Low	Low

Table 10.3 Assessment of impacts and contaminants of concern – operational phase

Project element	Contaminants of Potential Concern (COPC)	Description	Likelihood of contamination to be present or occur	Consequence	Potential contamination risk	Potential contamination risk following remediation/management
Segment factory operation						
Storage, use and transport of hazardous materials	Metals, PAHs, hydrocarbons, hazardous chemicals	Contamination may occur due to spills or unplanned releases of materials that are considered contaminants during the construction and operation phases of the project. This can include fuels or hazardous chemicals, such as hydraulic fluids or herbicides and potential spills at storage locations, use locations, or during transport.	Potentially present.	Unlikely exposure pathway for human or ecological receptors during construction and operation with appropriate management controls in place.	Low	Low
Vehicle use and storage	Hydrocarbons, PAHs	Contamination may occur due to spills or leaks of fuels, oils, etc from vehicles accessing the site.	Unlikely, unlikely to occur in significant volumes.	Unlikely exposure pathway for human or ecological receptors.	Low	Low

Table 10.4 Assessment of impacts and contaminants of concern – decommissioning phase

Project element	Contaminants of Potential Concern (COPC)	Description	Likelihood of contamination to be present or occur	Consequence	Potential contamination risk	Potential contamination risk following remediation/management
Decommissioning						
Decommissioning after completion of works	Metals, PAHs, hydrocarbons, hazardous chemicals	The site will be decommissioned after completion of Snowy 2.0 works. The proposed extent of remediation/rehabilitation required at the site is currently unknown.	Unlikely to be present at concentrations above criteria if management plans and controls are implemented during construction and operation phases.	Unlikely exposure pathway for human or ecological receptors.	Low	Low

11 Remediation and management

11.1 Further Investigations

This contamination assessment comprises a Preliminary Site Investigation (PSI) with limited sampling and is considered to satisfy the requirements of an EIS with regards to contamination. The results of sampling undertaken in the initial study area provide additional information on the contamination status of the site and will help to inform planning and management of construction activities and the factory operations.

Additional sampling could be undertaken in Lot 3 in DP 238762 to help refine the understanding of ground conditions, and provide further information prior to site preparation and construction. EMM recommends targeted soil sampling around the buildings, transmission tower, service pit, air crash site and creek bed. Sampling of potential ACM fragments is also recommended to confirm the presence or absence of asbestos.

The vertical extent of intrusive investigations undertaken was limited to the upper 0.5 m of soil. Should the proposed development require excavation to depths greater than 0.5 m, targeted sampling in the areas of foundations or footings is also recommended.

In addition, it is recommended that a MA of buildings located in the southern site area is completed prior to their demolition, to inform management requirements associated with HBM.

11.2 Remediation

Due to the presence of ACM fragments on the surface of the site (including potential ACM in Lot 3 in DP238762), it is recommended that a surface clearance (emu-bob or similar) is undertaken prior to construction activities commencing.

An Asbestos Management Plan (AMP) should be developed in accordance with the SafeWork Australia *Asbestos Codes of Practice and Guidance Notes*, NSW legislative requirements and relevant Australia and New Zealand Standards (WA DoH, 2009), to document the proposed remediation methodology and validation requirements.

11.3 Management

It is recommended that environmental management requirements for the site during the construction and operation of the proposed segment factory are documented in an Environmental Management Plan (EMP). The following sections outline specific requirements for this site.

11.3.1 Material re-use

Any material excavated and stockpiled on-site requires further testing to confirm its suitability for re-use on the site, or to appropriately classify the material of off-site disposal in accordance with the NSW EPA (2014) *Waste Classification Guidelines*. A materials classification plan should be prepared as part of the EMP outlining the required frequency of sampling, sampling methodology, assessment criteria for re-use and for off-site disposal, and analytical suites.

11.3.2 Imported fill

The EMP will specify that any fill materials imported to the site must be certified as VENM or ENM. Requirements for assessing imported fill materials and a material tracking protocol will be addressed in the appropriate project documents.

11.3.3 Contaminated land

There is potential to encounter unidentified contamination during the construction works. The EMP should include procedures and controls applicable to managing contamination, including preventing contamination as a result of construction and operational activities, as summarised below:

- an unexpected finds protocol, including procedures to identify potentially contaminated land, such as the observation of discolouration or staining of soils, visible signs of plant stress, presence of drums or other waste material, stockpiles or fill material, or odours. Where signs of contamination are identified, whether from known or unexpected sources, construction work within the affected areas would cease until a contamination assessment was undertaken to advise the need for further investigation or remediation;

- procedures for handling and storing waste, including handling of potentially or known contaminated material and protocols for waste classification and disposal; and

- an outline of control measures required to divert or capture surface water runoff from operational and storage areas of the factory. It is noted that the proposed project includes a first flush system in operational and aggregate storage areas.

Any assessment or management/remediation must be completed by suitably qualified and experienced persons in accordance with guidelines made or approved under the CLM Act.

In the event that stockpiles and the storage of fuels or chemicals are proposed within the construction area, all works must be designed to Australian Standards and all storage areas located at a distance of greater than 50 m from a watercourse. Any proposed oil/fuel storage bunds must be constructed and maintained in accordance with the Safe Work Australia (2017) *National Standard for the Storage and Handling of Workplace Dangerous Goods* and WorkCover NSW (2005) *Storage and Handling of Dangerous Goods Code of Practice*. Vehicles and machines must be properly maintained to minimise risk of fuel and oil leaks.

Management practices will be implemented to prevent hydrocarbon spills during construction activities (e.g. re-fuelling, maintenance, hydrocarbon storage) and appropriate spill containment materials must be available to clean-up spills if they occur.

11.3.4 Water quality, erosion and sediment controls

The EMP will outline water quality control measures to prevent potential contaminating materials entering the environment.

An erosion and sediment control plan will be prepared as part of the EMP. Where possible, containment measures and structures will be used to capture and/or treat runoff during the construction and operation of the proposed segment factory.

Control measures would not be removed until operations at the factory are complete. Disturbed areas would be re-vegetated where possible as part of the decommissioning works.

Further details on water management at the site is discussed in the project Water Assessment.

11.3.5 Decommissioning

Decommissioning of the site may also include requirements for remediation and restoration, based on the proposed future land use. The EMP should outline the required site closure standard and any works required to confirm contamination status at the end of operations.

12 Conclusion and recommendations

12.1 Conclusions

This Contamination Assessment was completed to support the EIS for the proposed segment factory, required as part of the construction of Snowy 2.0. It is proposed to develop a factory that will manufacture concrete segments that will be used to line the underground tunnels excavated as part of the Exploratory Work and the Main Works. The preferred location of the proposed segment factory is on land owned by Snowy Hydro in Polo Flat, an industrial area to the north-east of Cooma.

This assessment included the review of historical information, a site inspection and an intrusive investigation in targeted areas of the site. The desktop investigation identified potential on site sources of contamination, including site buildings and fragments of ACM at the site surface, and off-site sources of potential contamination that may have migrated onto the site. The findings of the site inspection and intrusive investigation did not indicate the presence of significant contamination in the areas investigated, in the context of future commercial/industrial land use. Groundwater was identified as having concentrations of metals greater than the adopted assessment criteria for protection of 95% of species in freshwater. However, due to the disturbed nature of the surrounding environment and the distance to any substantial watercourse, this is not considered to present an unacceptable risk or preclude the proposed development on the site.

The conceptual site model identified complete linkages between contamination sources, pathways and receptors, however, the risk assessment identified that remediation and management measures could be implemented to reduce the identified risks during construction and site operation.

Remediation and management measures are therefore recommended to minimise impacts to site users, surrounding workers and the environment. A EMP would be required for construction and operation of the facility.

12.2 Recommendations

Recommendations for remediation and management comprise:

- addressing the limited data available in the south-eastern portion of the site Targeted soil sampling is recommended in the vicinity of the transmission tower, buildings and storage area, services pit, air crash site and creek bed. A hazardous materials assessment of the buildings in this portion of the site should also be undertaken prior to demolition;

- a surface clearance (emu bob or similar) should be undertaken to remove fragments of ACM observed at the site surface. An asbestos management plan (AMP) would be required to document the clearance methodology and validation requirements, in accordance with the relevant regulations and guidelines. The surface clearance should be extended across the south eastern portion of the site for completeness;

- due to the identification of ACM at the site surface, topsoil or other materials excavated from the site will require further testing to confirm suitability for re-use on-site or appropriate classification for off-site disposal. Any materials imported to the site must be certified as VENM or ENM (note this requirement is in addition to any technical specification required for construction purposes and does not apply to aggregates brought onto site for concrete production); and

- preparation of an EMP, as discussed in Section 12, is recommended to document the above requirements, as well as typical environmental management measures, including:

- an unexpected finds protocol, including procedures to identify and manage contamination, if encountered;
- procedures for the handling and storage of waste, including contaminated materials;
- surface water management and sediment and erosion control;
- requirements for the storage of dangerous goods and other materials; and
- an outline of decommissioning requirements, including remediation and rehabilitation if necessary.

References

Australian and New Zealand Environment and Conservation Council and the National Health and Medical Research Council (1992) Guidelines for Assessment and Management of Contaminated sites

ANZECC 2000, *Australian and New Zealand Guidelines for Fresh and Marine Water Quality*, Volume 1, Australian and New Zealand Environment and Conservation Council (ANZECC) & Agriculture and Resource Management Council of Australia and New Zealand (ARMCANZ), October 2000

HEPA 2018, PFAS National Environmental Management Plan January 2018

Lotsearch 2019, Environmental Risk and Planning Report, dated 2 March 2018 (Reference: LS005414 EP)

Lewis and Glen 1995, Bega - Mallacoota 1:250,000 geological sheet

National Environment Protection Council (NEPC) 1999. *National Environment Protection (Assessment of Site Contamination) Measure 2013* (ASC NEPM, 2013)

NSW Department of Environment and Conservation (2006) Guidelines for the NSW site Auditor Scheme

NSW Department of Environment and Conservation (2007) Guidelines for the Assessment and Management of Groundwater Contamination

NSW Office of Environment and Heritage (2011) Guidelines for Consultants Reporting on Contaminated sites

NSW EPA 2014, *Waste Classification Guidelines*, NSW. Environment Protection Authority, November 2014

NSW EPA (2016) *Designing Sampling Programs for sites Potentially Contaminated by PFAS*

Standards Australia (2005) Australian Standard AS4482.1 - Guide to the Investigation and Sampling of sites with Potentially Contaminated Soil. Part 1: Non-volatile and Semi-Volatile Compounds

Standards Australia (1999) Australian Standard AS 4482.2 Guide to the sampling and investigation of potentially contaminated soil. Part 2: Volatile substances; and other relevant guidelines and legislation

Tulau MJ, 1994, *Soil Landscapes of the Cooma 1:100,000 Sheet map and report*, Department of Conservation and Land Management, Sydney

URS 2015, *Site Investigation and Remediation Assessment, Prepared for NSW Trade and Investment, Regional Infrastructure and Services,* 20 February 2015 (Reference: 43207484/Rep/1)

WA DoH 2009, *Guidelines for the Assessment, Remediation and Management of Asbestos Contaminated Sites in Western Australia*. Published by the Western Australia Department of Health, May 2009

Annexure A

Lot Search report

LOTSEARCH

LOTSEARCH ENVIRO PROFESSIONAL

Date: 13 Mar 2019 19:06:30

Reference: LS005414 EP

Address: Polo Flat Road, Cooma, NSW 2630

Table of Contents

Location Confidences

Where Lotsearch has had to georeference features from supplied addresses, a location confidence has been assigned to the data record. This indicates a confidence to the positional accuracy of the feature. Where applicable, a code is given under the field heading “LC” or “LocConf”. These codes lookup to the following location confidences:

LC Code	Location Confidence
Premise match	Georeferenced to the site location / premise or part of site
General area or suburb match	Georeferenced with the confidence of the general/approximate area
Road match	Georeferenced to the road or rail
Road intersection	Georeferenced to the road intersection
Feature is a buffered point	Feature is a buffered point
Land adjacent to geocoded site	Land adjacent to Georeferenced Site
Network of features	Georeferenced to a network of features

Dataset Listing

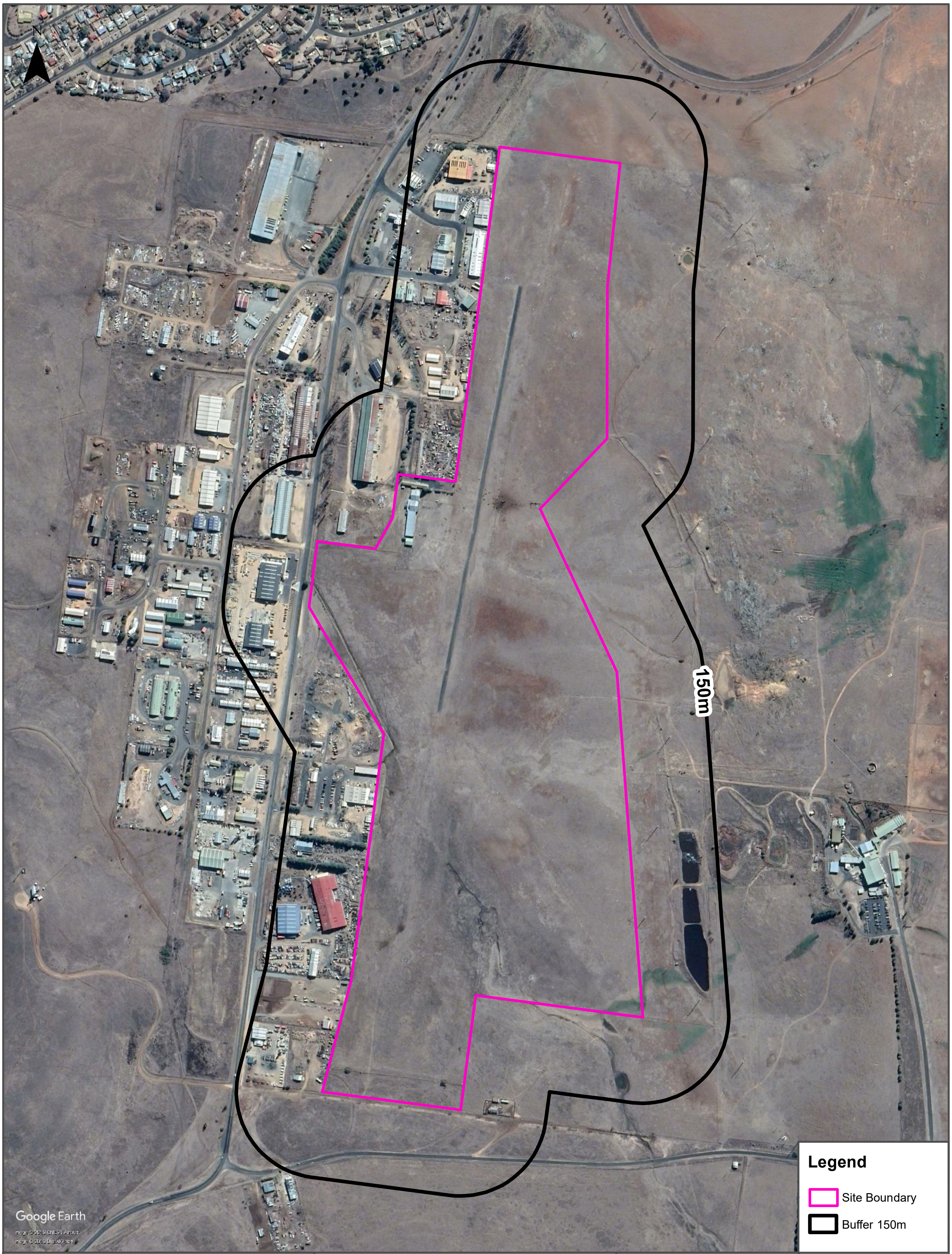
Datasets contained within this report, detailing their source and data currency:

Dataset Name	Custodian	Supply Date	Currency Date	Update Frequency	Dataset Buffer (m)	No. Features Onsite	No. Features within 100m	No. Features within Buffer
Cadastre Boundaries	NSW Department of Finance, Services & Innovation	13/03/2019	13/03/2019	Daily	-	-	-	-
Topographic Data	NSW Department of Finance, Services & Innovation	11/01/2019	11/01/2019	As required	-	-	-	-
List of NSW contaminated sites notified to EPA	Environment Protection Authority	18/02/2019	09/01/2019	Monthly	1000	0	0	1
Contaminated Land Records of Notice	Environment Protection Authority	11/03/2019	11/03/2019	Monthly	1000	0	0	0
Former Gasworks	Environment Protection Authority	04/03/2019	11/10/2017	Monthly	1000	0	0	0
National Waste Management Facilities Database	Geoscience Australia	05/02/2019	07/03/2017	Quarterly	1000	0	0	1
EPA PFAS Investigation Program	Environment Protection Authority	04/03/2019	04/03/2019	Monthly	2000	0	0	0
Defence PFAS Investigation & Management Program	Department of Defence	15/02/2019	15/02/2019	Monthly	2000	0	0	0
Airservices Australia National PFAS Management Program	Airservices Australia	11/03/2019	16/11/2018	Monthly	2000	0	0	0
EPA Other Sites with Contamination Issues	Environment Protection Authority	13/12/2018	13/12/2018	Annually	1000	0	0	0
Licensed Activities under the POEO Act 1997	Environment Protection Authority	28/02/2019	28/02/2019	Monthly	1000	0	2	5
Delicensed POEO Activities still regulated by the EPA	Environment Protection Authority	28/02/2019	28/02/2019	Monthly	1000	0	0	0
Former POEO Licensed Activities now revoked or surrendered	Environment Protection Authority	28/02/2019	28/02/2019	Monthly	1000	3	3	4
UPSS Environmentally Sensitive Zones	Environment Protection Authority	14/04/2015	12/01/2010	As required	1000	0	0	1
UBD Business Directory 1982 (Premise & Intersection Matches)	Hardie Grant			Not required	150	0	1	1
UBD Business Directory 1982 (Road & Area Matches)	Hardie Grant			Not required	150	-	3	3
UBD Business Directory 1970 (Premise & Intersection Matches)	Hardie Grant			Not required	150	0	0	0
UBD Business Directory 1970 (Road & Area Matches)	Hardie Grant			Not required	150	-	1	1
UBD Business Directory 1961 (Premise & Intersection Matches)	Hardie Grant			Not required	150	0	0	0
UBD Business Directory 1961 (Road & Area Matches)	Hardie Grant			Not required	150	-	0	0
UBD Business Directory 1950 (Premise & Intersection Matches)	Hardie Grant			Not required	150	0	0	0
UBD Business Directory 1950 (Road & Area Matches)	Hardie Grant			Not required	150	-	0	0
UBD Business Directory Drycleaners & Motor Garages/Service Stations (Premise & Intersection Matches)	Hardie Grant			Not required	500	0	0	0
UBD Business Directory Drycleaners & Motor Garages/Service Stations (Road & Area Matches)	Hardie Grant			Not required	500	-	0	0
Points of Interest	NSW Department of Finance, Services & Innovation	11/01/2019	11/01/2019	Quarterly	1000	1	5	24
Tanks (Areas)	NSW Department of Finance, Services & Innovation	11/01/2019	11/01/2019	Quarterly	1000	0	0	0
Tanks (Points)	NSW Department of Finance, Services & Innovation	11/01/2019	11/01/2019	Quarterly	1000	0	0	3
Major Easements	NSW Department of Finance, Services & Innovation	11/01/2019	11/01/2019	Quarterly	1000	1	4	11
State Forest	NSW Department of Finance, Services & Innovation	18/01/2018	18/01/2018	As required	1000	0	0	0

Dataset Name	Custodian	Supply Date	Currency Date	Update Frequency	Dataset Buffer (m)	No. Features Onsite	No. Features within 100m	No. Features within Buffer
NSW National Parks and Wildlife Service Reserves	NSW Office of Environment & Heritage	16/01/2019	14/11/2018	Annually	1000	0	0	0
Hydrogeology Map of Australia	Commonwealth of Australia (Geoscience Australia)	08/10/2014	17/03/2000	As required	1000	1	1	1
Botany Groundwater Management Zones	NSW Department of Primary Industries	15/03/2018	01/10/2005	As required	1000	0	0	0
Groundwater Boreholes	NSW Dept. of Primary Industries - Water NSW; Commonwealth of Australia (Bureau of Meteorology)	24/07/2018	23/07/2018	Annually	2000	0	0	27
Geological Units 1:250,000	NSW Dept. of Industry, Resources & Energy	20/08/2014		None planned	1000	2	-	5
Geological Structures 1:250,000	NSW Dept. of Industry, Resources & Energy	20/08/2014		None planned	1000	2	-	4
Naturally Occurring Asbestos Potential	NSW Dept. of Industry, Resources & Energy	04/12/2015	24/09/2015	Unknown	1000	0	0	0
Soil Landscapes	NSW Office of Environment & Heritage	12/08/2014		None planned	1000	1	-	3
Atlas of Australian Soils	CSIRO	19/05/2017	17/02/2011	As required	1000	1	1	2
Environmental Planning Instrument Acid Sulfate Soils	NSW Department of Planning and Environment	12/03/2019	09/11/2018	Weekly	500	0		
Atlas of Australian Acid Sulfate Soils	CSIRO	19/01/2017	21/02/2013	As required	1000	1	1	1
Dryland Salinity - National Assessment	National Land and Water Resources Audit	18/07/2014	12/05/2013	None planned	1000	0	0	0
Dryland Salinity Potential of Western Sydney	NSW Office of Environment & Heritage	12/05/2017	01/01/2002	None planned	1000	-	-	-
Mining Subsidence Districts	NSW Department of Finance, Services & Innovation	13/07/2017	01/07/2017	As required	1000	0	0	0
SEPP State Significant Precincts	NSW Department of Planning and Environment	12/03/2019	04/07/2104	Weekly	1000	0	0	0
Environmental Planning Instrument Land Zoning	NSW Department of Planning and Environment	12/03/2019	08/02/2019	Weekly	1000	1	5	32
Commonwealth Heritage List	Australian Government Department of the Environment and Energy - Heritage Branch	16/01/2019	31/07/2018	Unknown	1000	0	0	0
National Heritage List	Australian Government Department of the Environment and Energy - Heritage Branch	16/01/2019	28/09/2018	Unknown	1000	0	0	0
State Heritage Register - Curtilages	NSW Office of Environment & Heritage	16/01/2019	09/11/2018	Quarterly	1000	0	0	1
Environmental Planning Instrument Heritage	NSW Department of Planning and Environment	12/03/2019	18/01/2019	Weekly	1000	0	1	7
Bush Fire Prone Land	NSW Rural Fire Service	26/02/2019	01/11/2018	Quarterly	1000	0	0	1
Vegetation of Southern Forests	NSW Office of Environment & Heritage	09/12/2014	10/10/2011	Unknown	1000	0	1	2
Ramsar Wetlands of Australia	Commonwealth of Australia Department of the Environment	08/10/2014	24/06/2011	As required	1000	0	0	0
Groundwater Dependent Ecosystems	Bureau of Meteorology	14/08/2017	15/05/2017	Unknown	1000	0	0	0
Inflow Dependent Ecosystems Likelihood	Bureau of Meteorology	14/08/2017	15/05/2017	Unknown	1000	0	0	0
NSW BioNet Species Sightings	NSW Office of Environment & Heritage	13/03/2019	13/03/2019	Weekly	10000	-	-	-

Aerial Imagery 2018

Polo Flat Road, Cooma, NSW 2630



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Data Source Aerial Imagery: © 2019 Google Inc, used with permission. Google and the Google logo are registered trademarks of Google Inc.

Coordinate System:
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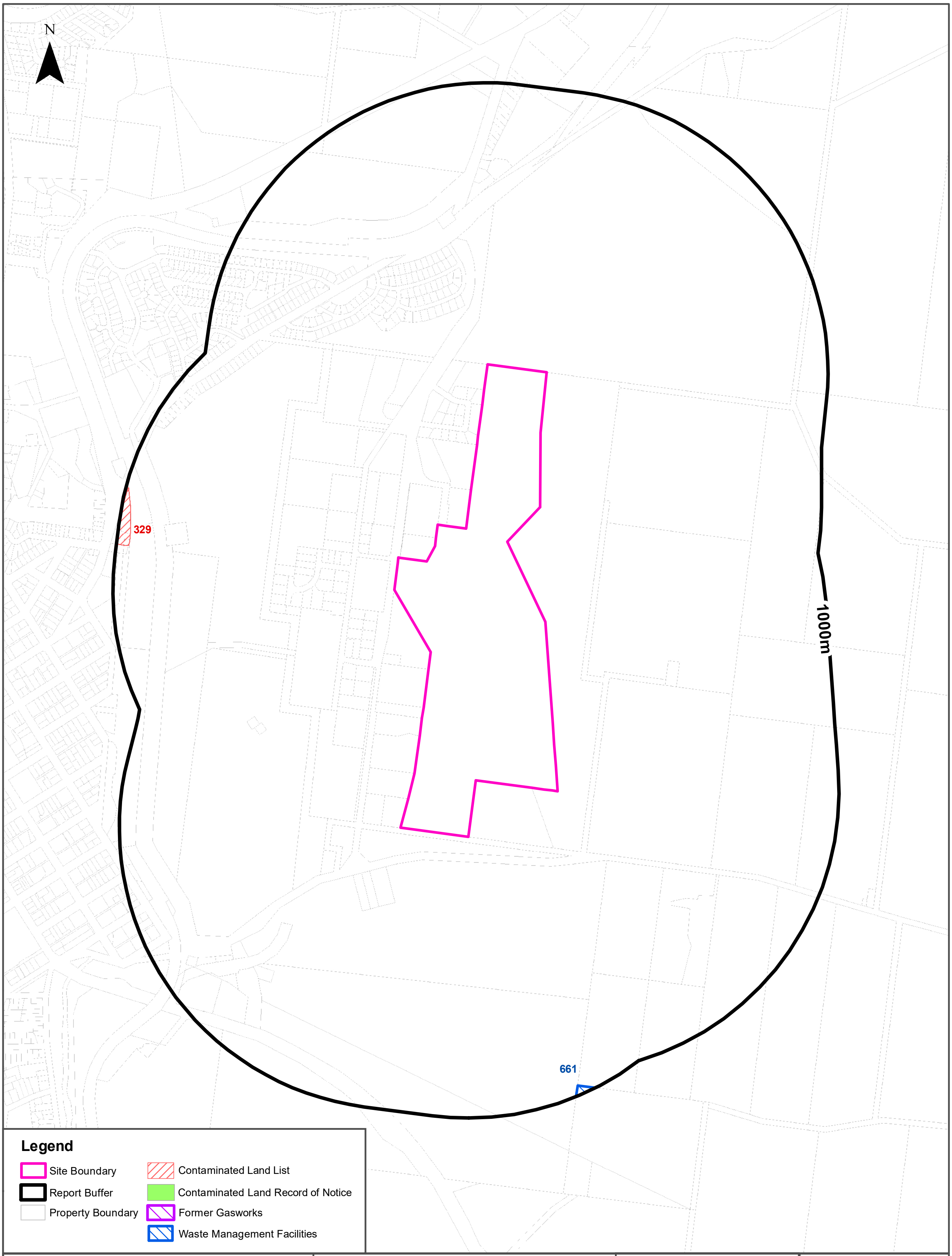
Date: 12 March 2019

Contaminated Land & Waste Management Facilities

Polo Flat Road, Cooma, NSW 2630



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Meters

Data Sources: Property Boundaries & Topographic Data:
© Department Finance, Services & Innovation 2019

Coordinate System:
GDA 1994 MGA Zone 56

Date: 13 March 2019

Contaminated Land & Waste Management Facilities

Polo Flat Road, Cooma, NSW 2630

List of NSW contaminated sites notified to EPA

Records from the NSW EPA Contaminated Land list within the dataset buffer:

Map Id	Site	Address	Suburb	Activity	Management Class	Status	Location Confidence	Dist (m)	Direction
329	Lowes Petroleum Cooma Depot and Service Station (Former BP Reliance Petroleum)	2-4 Sharp Street	Cooma	Other Petroleum	Regulation under CLM Act not required	Current EPA List	Premise Match	954m	West

The values within the EPA site management class in the table above, are given more detailed explanations in the table below:

EPA site management class	Explanation
Contamination being managed via the planning process (EP&A Act)	The EPA has completed an assessment of the contamination and decided that the contamination is significant enough to warrant regulation. The contamination of this site is managed by the consent authority under the Environmental Planning and Assessment Act 1979 (EP&A Act) planning approval process, with EPA involvement as necessary to ensure significant contamination is adequately addressed. The consent authority is typically a local council or the Department of Planning and Environment.
Contamination currently regulated under CLM Act	The EPA has completed an assessment of the contamination and decided that the contamination is significant enough to warrant regulation under the Contaminated Land Management Act 1997 (CLM Act). Management of the contamination is regulated by the EPA under the CLM Act. Regulatory notices are available on the EPA's Contaminated Land Public Record of Notices.
Contamination currently regulated under POEO Act	The EPA has completed an assessment of the contamination and decided that the contamination is significant enough to warrant regulation. Management of the contamination is regulated under the Protection of the Environment Operations Act 1997 (POEO Act). The EPA's regulatory actions under the POEO Act are available on the POEO public register.
Contamination formerly regulated under the CLM Act	The EPA has determined that the contamination is no longer significant enough to warrant regulation under the Contaminated Land Management Act 1997 (CLM Act). The contamination was addressed under the CLM Act.
Contamination formerly regulated under the POEO Act	The EPA has determined that the contamination is no longer significant enough to warrant regulation. The contamination was addressed under the Protection of the Environment Operations Act 1997 (POEO Act).
Contamination was addressed via the planning process (EP&A Act)	The EPA has determined that the contamination is no longer significant enough to warrant regulation. The contamination was addressed by the appropriate consent authority via the planning process under the Environmental Planning and Assessment Act 1979 (EP&A Act).
Ongoing maintenance required to manage residual contamination (CLM Act)	The EPA has determined that ongoing maintenance, under the Contaminated Land Management Act 1997 (CLM Act), is required to manage the residual contamination. Regulatory notices under the CLM Act are available on the EPA's Contaminated Land Public Record of Notices.
Regulation being finalised	The EPA has completed an assessment of the contamination and decided that the contamination is significant enough to warrant regulation under the Contaminated Land Management Act 1997. A regulatory approach is being finalised.
Regulation under the CLM Act not required	The EPA has completed an assessment of the contamination and decided that regulation under the Contaminated Land Management Act 1997 is not required.
Under assessment	The contamination is being assessed by the EPA to determine whether regulation is required. The EPA may require further information to complete the assessment. For example, the completion of management actions regulated under the planning process or Protection of the Environment Operations Act 1997. Alternatively, the EPA may require information via a notice issued under s77 of the Contaminated Land Management Act 1997 or issue a Preliminary Investigation Order.

NSW EPA Contaminated Land List Data Source: Environment Protection Authority

Contaminated Land & Waste Management Facilities

Polo Flat Road, Cooma, NSW 2630

Contaminated Land: Records of Notice

Record of Notices within the dataset buffer:

Map Id	Name	Address	Suburb	Notices	Area No	Location Confidence	Distance	Direction
N/A	No records in buffer							

Contaminated Land Records of Notice Data Source: Environment Protection Authority

Former Gasworks

Former Gasworks within the dataset buffer:

Map Id	Location	Council	Further Info	Location Confidence	Distance	Direction
N/A	No records in buffer					

Former Gasworks Data Source: Environment Protection Authority

National Waste Management Site Database

Sites on the National Waste Management Site Database within the dataset buffer:

Site Id	Owner	Name	Address	Suburb	Class	Landfill	Reprocess	Transfer	Comments	Loc Conf	Dist (m)	Direction
661	Cooma Monaro Shire Council	Cooma Landfill	Monaro Highway	Cooma	Landfill	Operational				Premise Match	965 m	South

Waste Management Facilities Data Source: Geoscience Australia

PFAS Investigation Sites

Polo Flat Road, Cooma, NSW 2630

EPA PFAS Investigation Program

Sites that are part of the EPA PFAS investigation program, within the dataset buffer:

Id	Site	Address	Loc Conf	Dist	Dir
N/A	No records in buffer				

EPA PFAS Investigation Program: Environment Protection Authority

Defence PFAS Investigation & Management Program

Sites being investigated or managed by the Department of Defence for PFAS contamination within the dataset buffer:

Property ID	Base Name	Address	Loc Conf	Dist	Dir
N/A	No records in buffer				

Defence PFAS Investigation & Management Program Data Custodian: Department of Defence, Australian Government

Airservices Australia National PFAS Management Program

Sites being investigated or managed by Airservices Australia for PFAS contamination within the dataset buffer:

Map ID	Site Name	Impacts	Loc Conf	Dist	Dir
N/A	No records in buffer				

Airservices Australia National PFAS Management Program Data Custodian: Airservices Australia

EPA Other Sites with Contamination Issues

Polo Flat Road, Cooma, NSW 2630

EPA Other Sites with Contamination Issues

This dataset contains other sites identified on the EPA website as having contamination issues. This dataset currently includes:

- James Hardie asbestos manufacturing and waste disposal sites
- Radiological investigation sites in Hunter's Hill
- Pasminco Lead Abatement Strategy Area

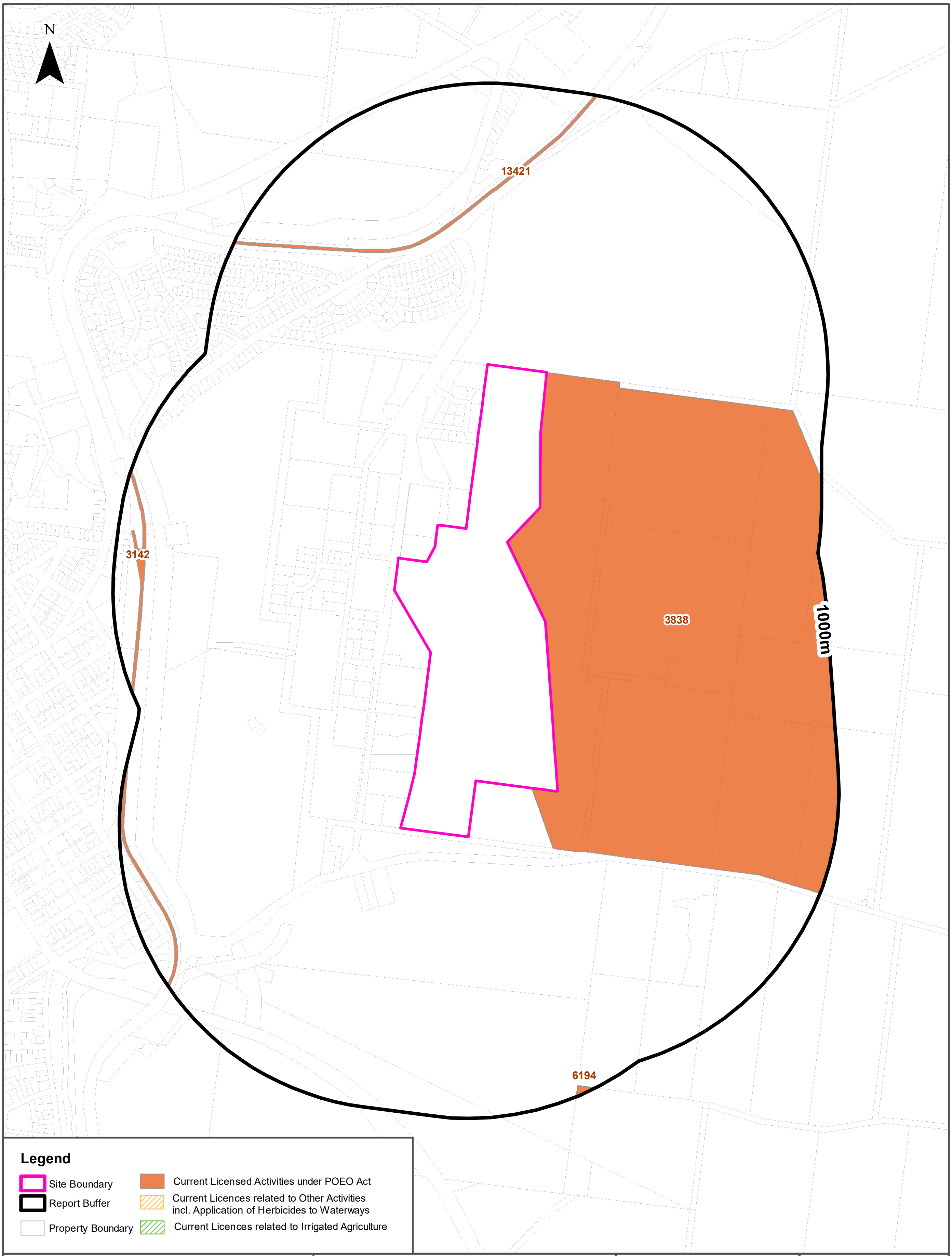
Sites within the dataset buffer:

Site Id	Site Name	Site Address	Dataset	Comments	Location Confidence	Distance	Direction
N/A	No records in buffer						

EPA Other Sites with Contamination Issues: Environment Protection Authority

Current EPA Licensed Activities

Polo Flat Road, Cooma, NSW 2630



Scale:
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Meters

Data Sources: Property Boundaries & Topographic Data:
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Coordinate System:
GDA 1994 MGA Zone 56

Date: 13 March 2019

EPA Activities

Polo Flat Road, Cooma, NSW 2630

Licensed Activities under the POEO Act 1997

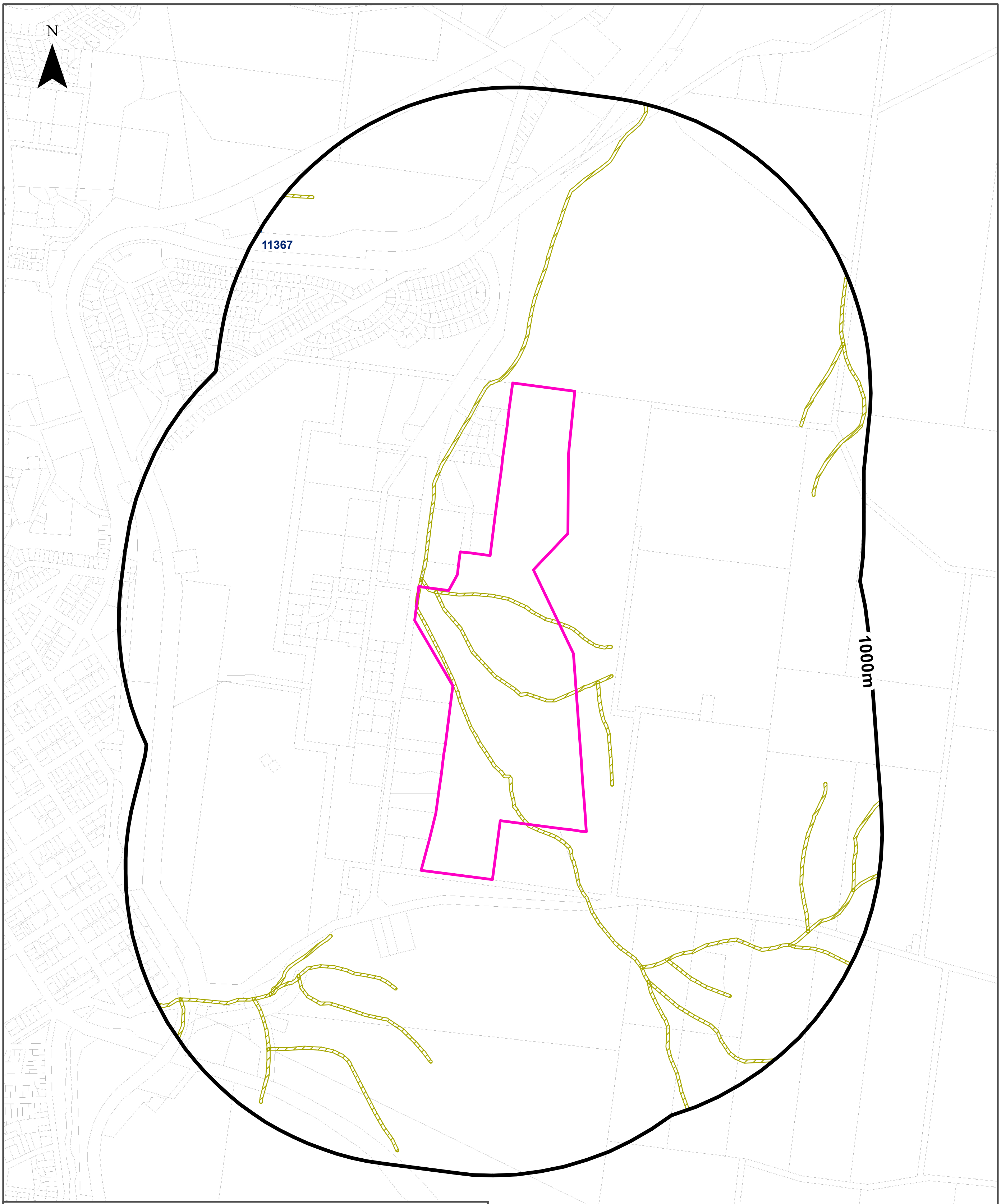
Licensed activities under the Protection of the Environment Operations Act 1997, within the dataset buffer:

EPL	Organisation	Name	Address	Suburb	Activity	Loc Conf	Distance	Direction
3838	MONBEEF PTY LIMITED	MONBEEF MEAT PROCESSING PLANT AND PREMISES	CARLAMINDA ROAD	COOMA	Rendering or fat extraction	Premise Match	0m	East
3838	MONBEEF PTY LIMITED	MONBEEF MEAT PROCESSING PLANT AND PREMISES	CARLAMINDA ROAD	COOMA	Slaughtering or processing animals	Premise Match	0m	East
3142	AUSTRALIAN RAIL TRACK CORPORATION LIMITED		Australian Rail Track Corporation (ARTC) network as defined by the ARTC Network Deeds within NSW., SYDNEY, NSW 2001		Railway systems activities	Network of Features	490m	North West
13421	JOHN HOLLAND RAIL PTY LTD		PO Box 215 , PARRAMATTA, NSW 2124		Railway systems activities	Network of Features	490m	North West
6194	SNOWY MONARO REGIONAL COUNCIL	COOMA LANDFILL	8448 MONARO HIGHWAY	COOMA	Waste disposal by application to land	Premise Match	965m	South

POEO Licence Data Source: Environment Protection Authority

Delicensed & Former Licensed EPA Activities

Polo Flat Road, Cooma, NSW 2630



Legend

🟪	Site Boundary	🟩	Delicensed Activities still Regulated by EPA
⬛	Report Buffer	▨	Former Licensed/Regulated Activities (revoked or surrendered)
☐	Property Boundary	▨	Surrendered Licences related to Other Activities on Waterways incl. Application of Herbicides

Scale:

Property Boundary Data Source:
© Department Finance, Services & Innovation 2019

Coordinate System:
GDA 1994 MGA Zone 56

Date: 13 March 2019

EPA Activities

Polo Flat Road, Cooma, NSW 2630

Delicensed Activities still regulated by the EPA

Delicensed activities still regulated by the EPA, within the dataset buffer:

Licence No	Organisation	Name	Address	Suburb	Activity	Loc Conf	Distance	Direction
N/A	No records in buffer							

Delicensed Activities Data Source: Environment Protection Authority

Former Licensed Activities under the POEO Act 1997, now revoked or surrendered

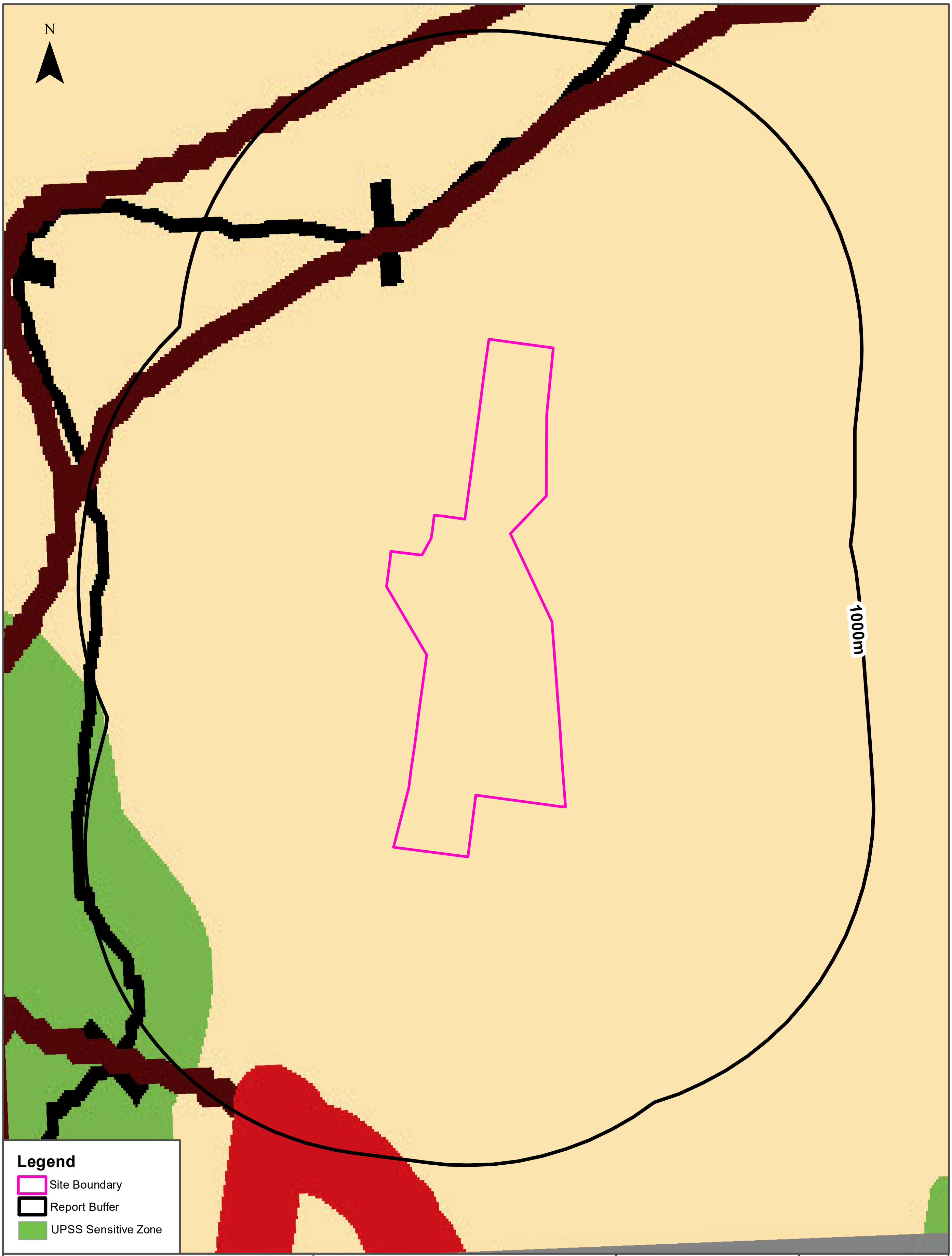
Former Licensed activities under the Protection of the Environment Operations Act 1997, now revoked or surrendered, within the dataset buffer:

Licence No	Organisation	Location	Status	Issued Date	Activity	Loc Conf	Distance	Direction
4653	LUHRMANN ENVIRONMENT MANAGEMENT PTY LTD	WATERWAYS THROUGHOUT NSW	Surrendered		Other Activities / Non Scheduled Activity - Application of Herbicides	Network of Features	0m	Onsite
4838	Robert Orchard	Various Waterways throughout New South Wales - SYDNEY NSW 2000	Surrendered		Other Activities / Non Scheduled Activity - Application of Herbicides	Network of Features	0m	Onsite
6630	SYDNEY WEED & PEST MANAGEMENT PTY LTD	WATERWAYS THROUGHOUT NSW - PROSPECT, NSW, 2148	Surrendered		Other Activities / Non Scheduled Activity - Application of Herbicides	Network of Features	0m	Onsite
11367	TRANSGRID	Monaro Highway, COOMA, NSW 2630	Surrendered	30/03/2001	Hazardous, Industrial or Group A Waste Generation or Storage	Premise Match	991m	North West

Former Licensed Activities Data Source: Environment Protection Authority

UPSS Sensitive Zones

Polo Flat Road, Cooma, NSW 2630



Legend

- ▭ Site Boundary
- ▭ Report Buffer
- 🟩 UPSS Sensitive Zone

Scale:

UPSS Data Source: Environment Protection Authority
© Dept of Environment, Climate Change & Water (NSW)

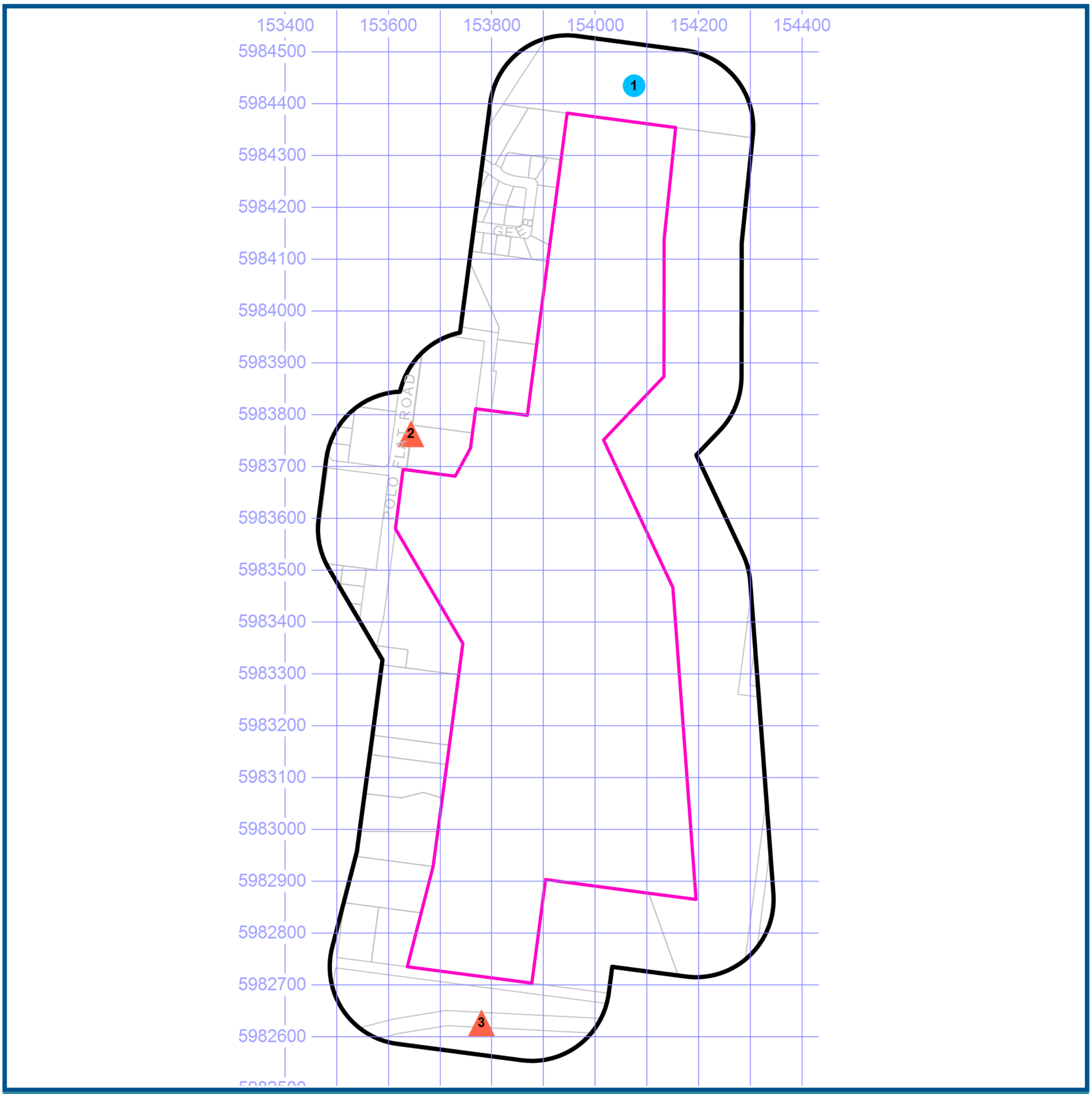
Coordinate System:
GDA 1994 MGA Zone 56

Date: 13 March 2019

Historical Business Directories

Polo Flat Road, Cooma, NSW 2630

1982 Business Directory Records



🟪	Site Boundary	●	Business directory records mapped to a specific premise
⬛	Buffer 150m	🟩	Business directory records mapped to a road intersection
☐	Property Boundaries	▲	Business directory records mapped to a road corridor
		▨	Business directory records mapped to a general area

N

Projected Coordinate System:
GDA94 MGA Zone 56

Data Sources: Universal Business Directories (UBD), derived data, licensed from Hardie Grant.
Property Boundaries © NSW Department Finance, Services & Innovation 2019

Historical Business Directories

Polo Flat Road, Cooma, NSW 2630

1982 Business Directory Records
Premise or Road Intersection Matches

Records from the 1982 UBD Business Directory, mapped to a premise or road intersection, within the dataset buffer:

Map Id	Business Activity	Premise	Ref No.	Location Confidence	Distance to Property Boundary or Road Intersection	Direction
1	ASSOCIATIONS, SOCIETIES, CLUBS &/OR SPORTING BODIES	Cooma Race Club, .Racecourse., Cooma	154472	Premise Match	0m	North

Business Directory Content Derived from Universal Business Directories (UBD) - Licensed from Hardie Grant

1982 Business Directory Records
Road or Area Matches

Records from the 1982 UBD Business Directory, mapped to a road or an area, within the dataset buffer. Records are mapped to the road when a building number is not supplied, cannot be found, or the road has been renumbered since the directory was published:

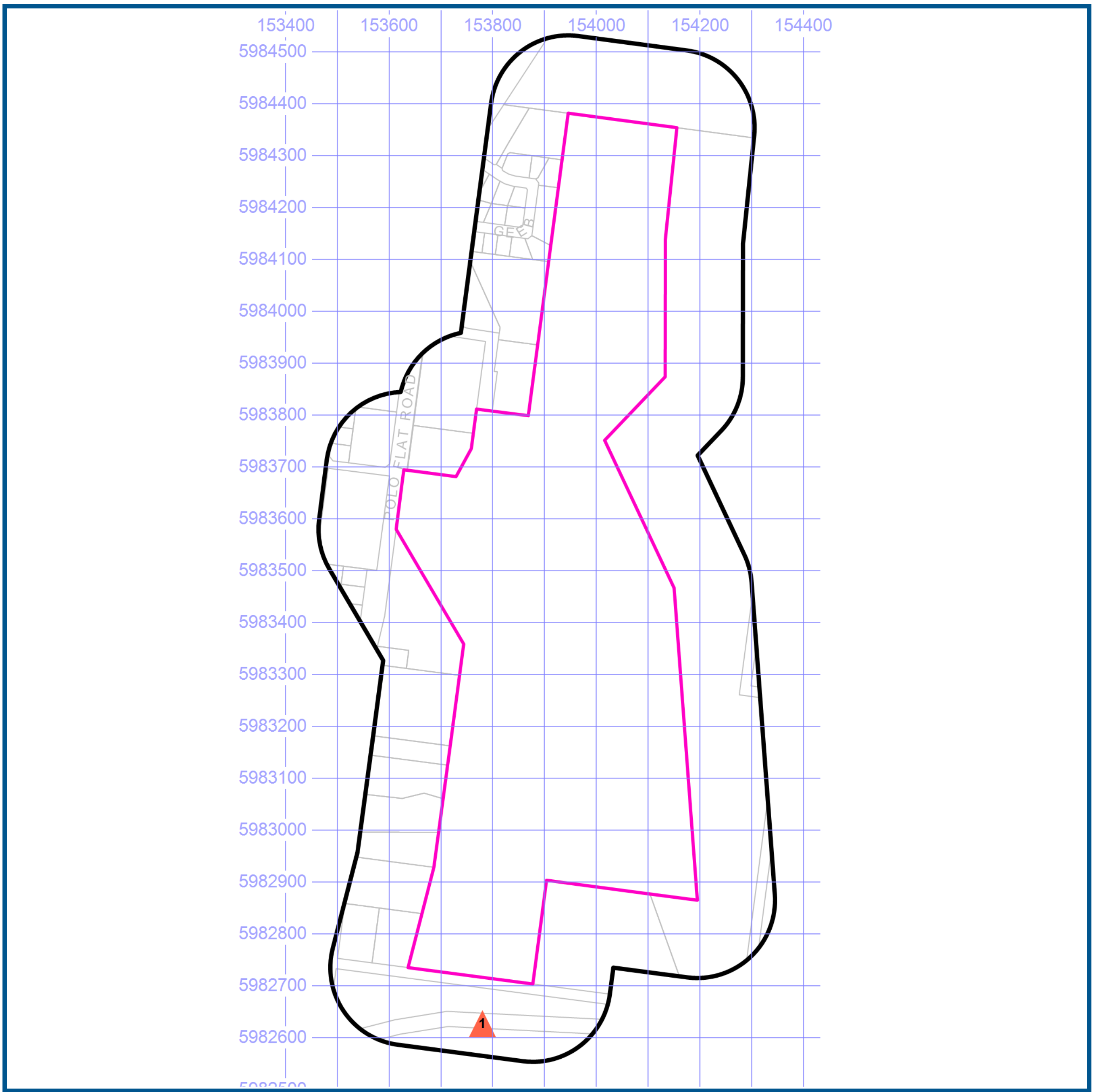
Map Id	Business Activity	Premise	Ref No.	Location Confidence	Distance to Road Corridor or Area
2	JOINERY MANUFACTURERS	Coomalock Homes Pty. Ltd., Polo Flat Rd., Cooma	154735	Road Match	0m
	BRICK MFRS. &/OR DISTS	Monaro Bricks Ltd., Polo Flat Rd., Cooma	154510	Road Match	0m
3	WOOL, SKIN & HIDE BUYERS	New Zealand Trading Co. Pty. Ltd.. Carlaminda Rd., Polo Flat, Cooma	154999	Road Match	61m

Business Directory Content Derived from Universal Business Directories (UBD) - Licensed from Hardie Grant

Historical Business Directories

Polo Flat Road, Cooma, NSW 2630

1970 Business Directory Records



🟪 Site Boundary

⬛ Buffer 150m

☐ Property Boundaries

● Business directory records mapped to a specific premise

■ Business directory records mapped to a road intersection

▲ Business directory records mapped to a road corridor

▨ Business directory records mapped to a general area

N

Projected Coordinate System:
GDA94 MGA Zone 56

Data Sources: Universal Business Directories (UBD), derived data, licensed from Hardie Grant.
Property Boundaries © NSW Department Finance, Services & Innovation 2019

Historical Business Directories

Polo Flat Road, Cooma, NSW 2630

1970 Business Directory Records Premise or Road Intersection Matches

Records from the 1970 UBD Business Directory, mapped to a premise or road intersection, within the dataset buffer:

Map Id	Business Activity	Premise	Ref No.	Location Confidence	Distance to Property Boundary or Road Intersection	Direction
	No records in buffer					

Business Directory Content Derived from Universal Business Directories (UBD) - Licensed from Hardie Grant

1970 Business Directory Records Road or Area Matches

Records from the 1970 UBD Business Directory, mapped to a road or an area, within the dataset buffer. Records are mapped to the road when a building number is not supplied, cannot be found, or the road has been renumbered since the directory was published:

Map Id	Business Activity	Premise	Ref No.	Location Confidence	Distance to Road Corridor or Area
1	WOOL, SKIN & HIDE BUYERS	New Zealand Trading Co. Pty. Ltd., Carlaminda Rd., Polo Flat Cooma	585720	Road Match	61m

Business Directory Content Derived from Universal Business Directories (UBD) - Licensed from Hardie Grant

Historical Business Directories

Polo Flat Road, Cooma, NSW 2630

1961 Business Directory Records Premise or Road Intersection Matches

Records from the 1961 UBD Business Directory, mapped to a premise or road intersection, within the dataset buffer:

Map Id	Business Activity	Premise	Ref No.	Location Confidence	Distance to Property Boundary or Road Intersection	Direction
	No records in buffer					

Business Directory Content Derived from Universal Business Directories (UBD) - Licensed from Hardie Grant

1961 Business Directory Records Road or Area Matches

Records from the 1961 UBD Business Directory, mapped to a road or an area, within the dataset buffer. Records are mapped to the road when a building number is not supplied, cannot be found, or the road has been renumbered since the directory was published:

Map Id	Business Activity	Premise	Ref No.	Location Confidence	Distance to Road Corridor or Area
	No records in buffer				

Business Directory Content Derived from Universal Business Directories (UBD) - Licensed from Hardie Grant

Historical Business Directories

Polo Flat Road, Cooma, NSW 2630

1950 Business Directory Records Premise or Road Intersection Matches

Records from the 1950 UBD Business Directory, mapped to a premise or road intersection, within the dataset buffer:

Map Id	Business Activity	Premise	Ref No.	Location Confidence	Distance to Property Boundary or Road Intersection	Direction
	No records in buffer					

Business Directory Content Derived from Universal Business Directories (UBD) - Licensed from Hardie Grant

1950 Business Directory Records Road or Area Matches

Records from the 1950 UBD Business Directory, mapped to a road or an area, within the dataset buffer. Records are mapped to the road when a building number is not supplied, cannot be found, or the road has been renumbered since the directory was published:

Map Id	Business Activity	Premise	Ref No.	Location Confidence	Distance to Road Corridor or Area
	No records in buffer				

Business Directory Content Derived from Universal Business Directories (UBD) - Licensed from Hardie Grant

Historical Business Directories

Polo Flat Road, Cooma, NSW 2630

Dry Cleaners, Motor Garages & Service Stations Premise or Road Intersection Matches

Dry Cleaners, Motor Garages & Service Stations from UBD Business Directories, mapped to a premise or road intersection, within the dataset buffer.

Map Id	Business Activity	Premise	Ref No.	Year	Location Confidence	Distance to Property Boundary or Road Intersection	Direction
	No records in buffer						

Business Directory Content Derived from Universal Business Directories (UBD) - Licensed from Hardie Grant

Dry Cleaners, Motor Garages & Service Stations Road or Area Matches

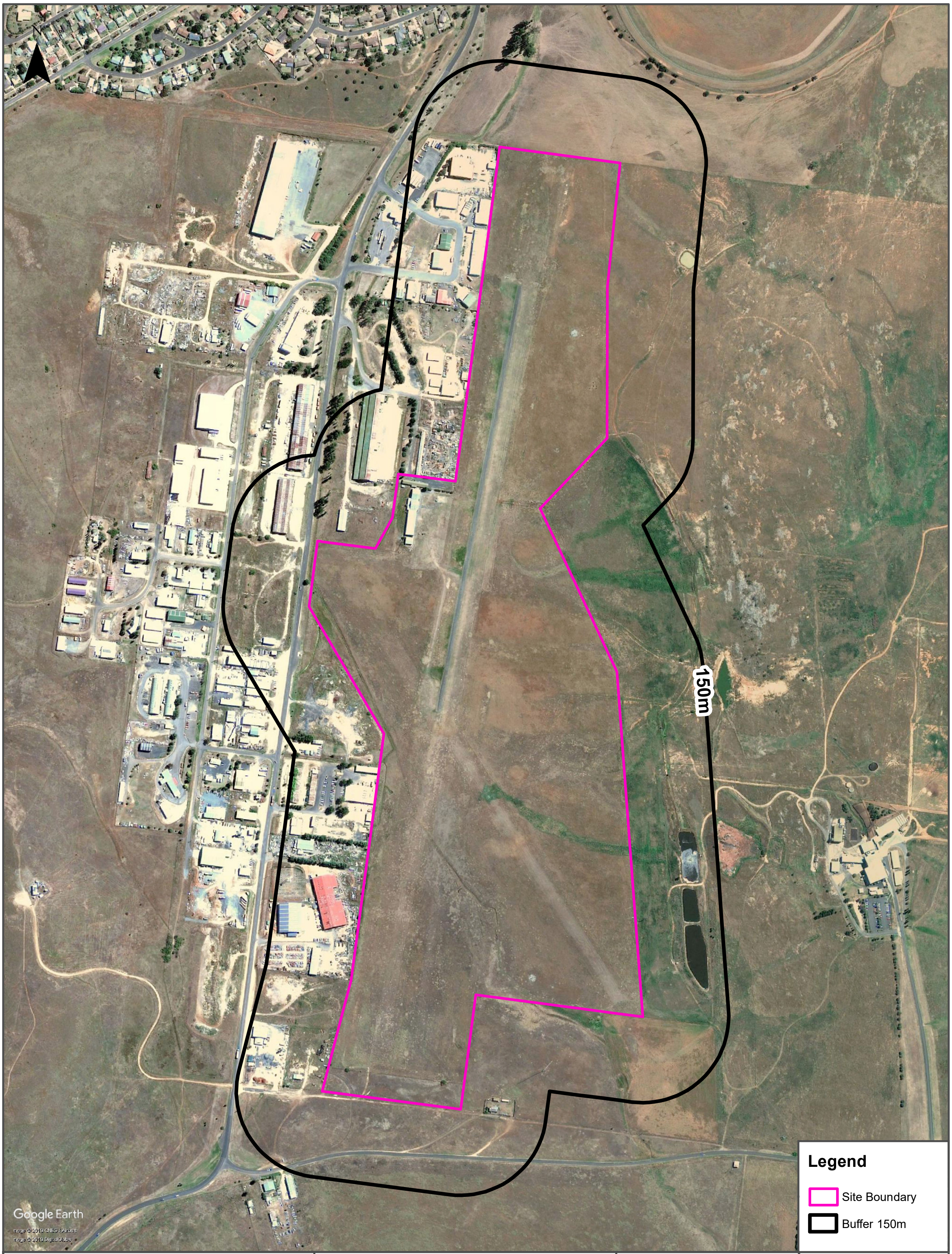
Dry Cleaners, Motor Garages & Service Stations from UBD Business Directories, mapped to a road or an area, within the dataset buffer. Records are mapped to the road when a building number is not supplied, cannot be found, or the road has been renumbered since the directory was published.

Map Id	Business Activity	Premise	Ref No.	Year	Location Confidence	Distance to Road Corridor or Area
	No records in buffer					

Business Directory Content Derived from Universal Business Directories (UBD) - Licensed from Hardie Grant

Aerial Imagery 2011

Polo Flat Road, Cooma, NSW 2630



Legend

🟪 Site Boundary

⬛ Buffer 150m

Scale:
0 100 200 400
Meters

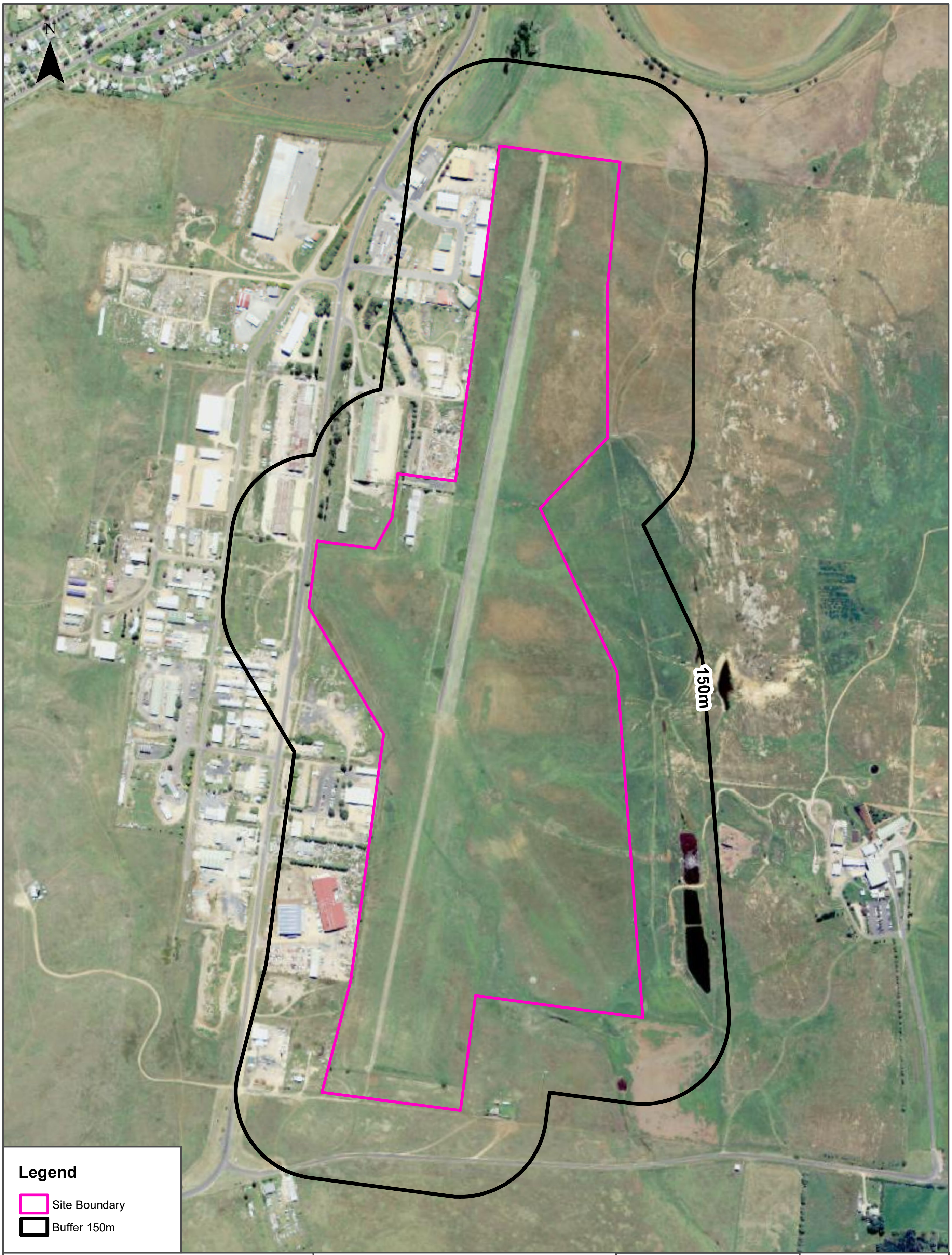
Data Source Aerial Imagery: © 2019 Google Inc, used with permission. Google and the Google logo are registered trademarks of Google Inc.

Coordinate System:
GDA 1994 MGA Zone 56

Date: 12 March 2019

Aerial Imagery 2009

Polo Flat Road, Cooma, NSW 2630



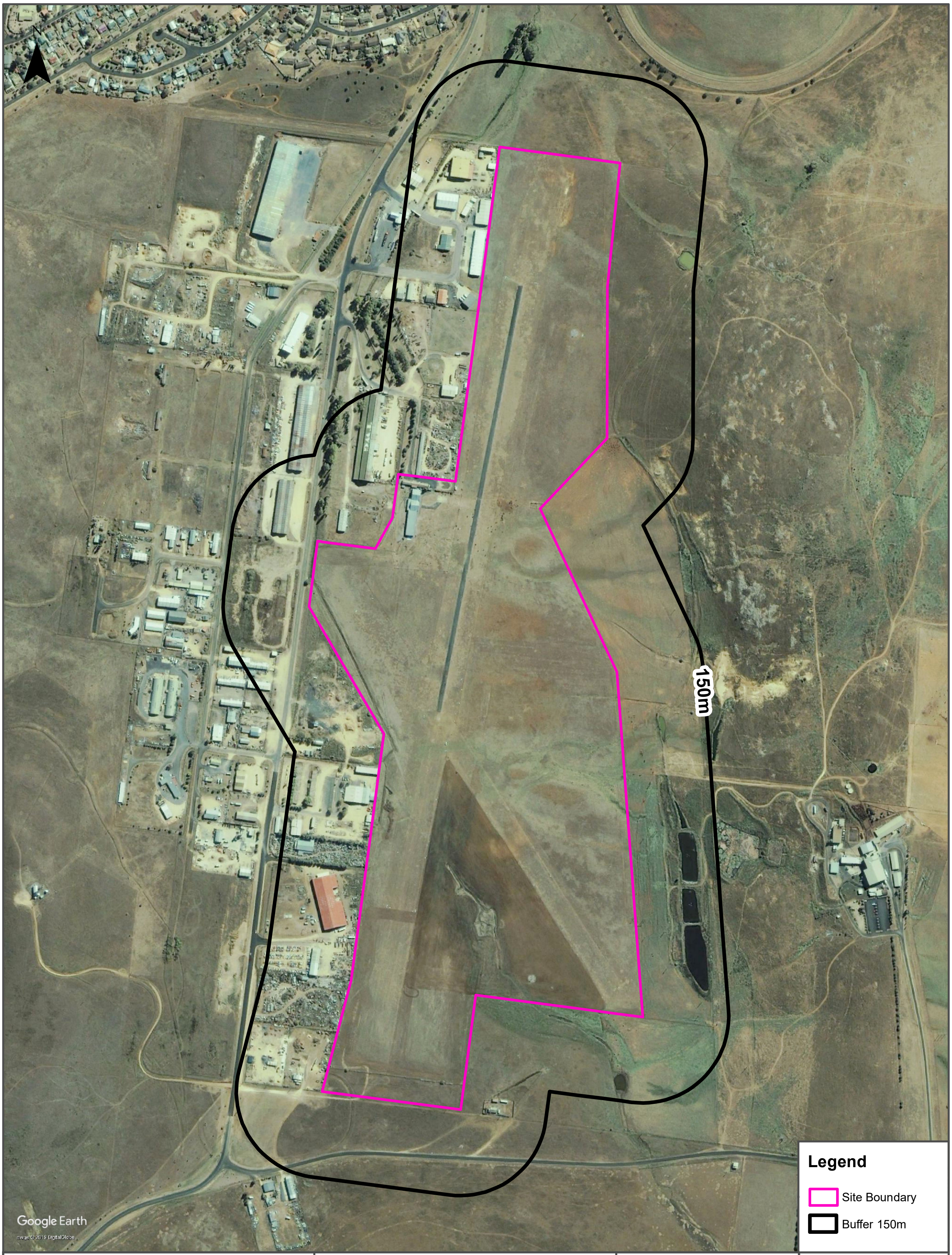
Legend

- 🟪 Site Boundary
- ⬛ Buffer 150m

Scale: 0 50 100 200 300 400 Metres	Data Sources: Aerial Imagery © Department Finance, Services & Innovation	Coordinate System: GDA 1994 MGA Zone 56	Date: 13 March 2019

Aerial Imagery 2002

Polo Flat Road, Cooma, NSW 2630



Legend

🟪 Site Boundary

⬛ Buffer 150m

Scale:
0 100 200 400
Meters

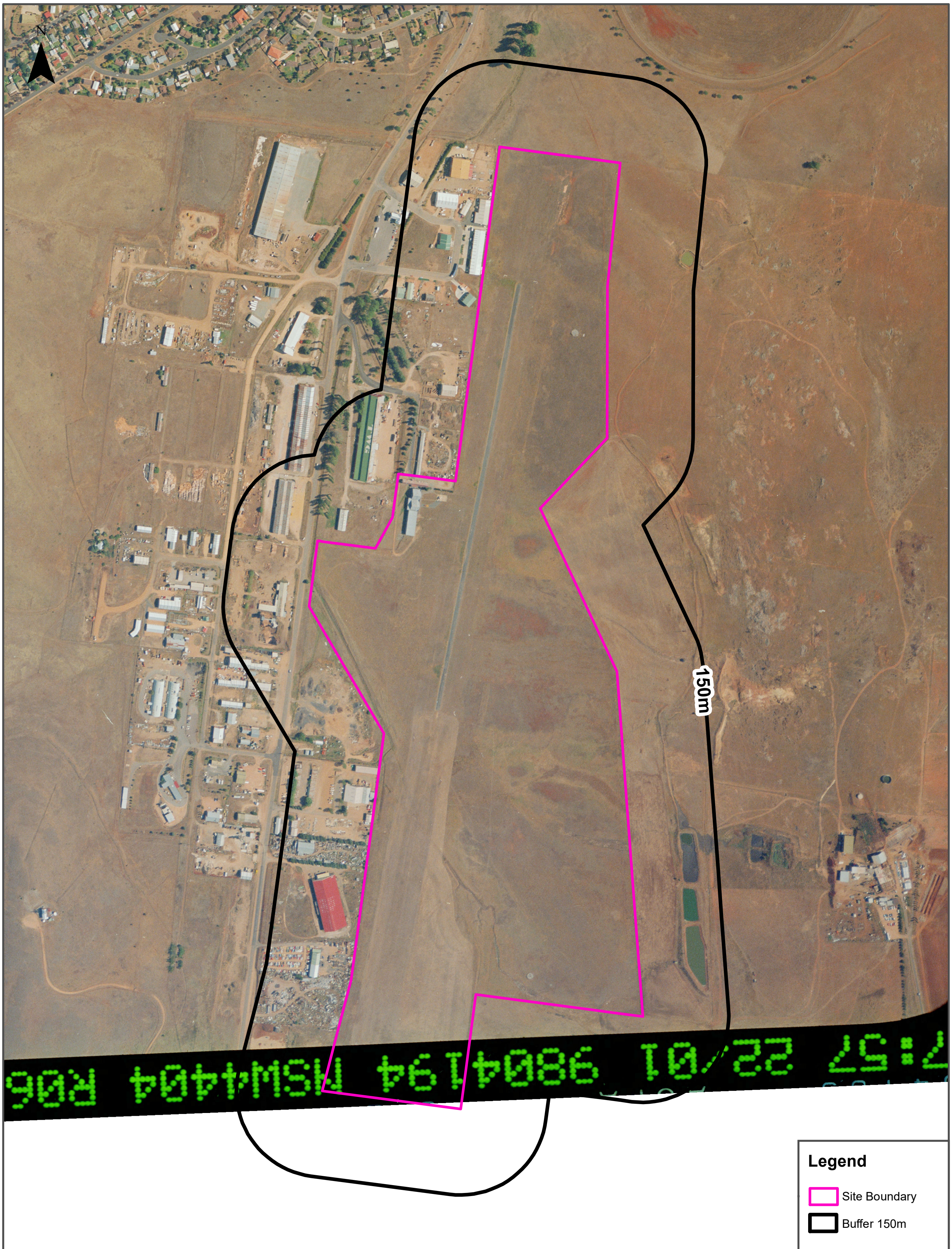
Data Source Aerial Imagery: © 2019 Google Inc, used with permission. Google and the Google logo are registered trademarks of Google Inc.

Coordinate System:
GDA 1994 MGA Zone 56

Date: 12 March 2019

Aerial Imagery 1998

Polo Flat Road, Cooma, NSW 2630

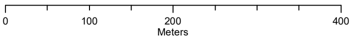


Legend

▭ Site Boundary

▭ Buffer 150m

Scale:



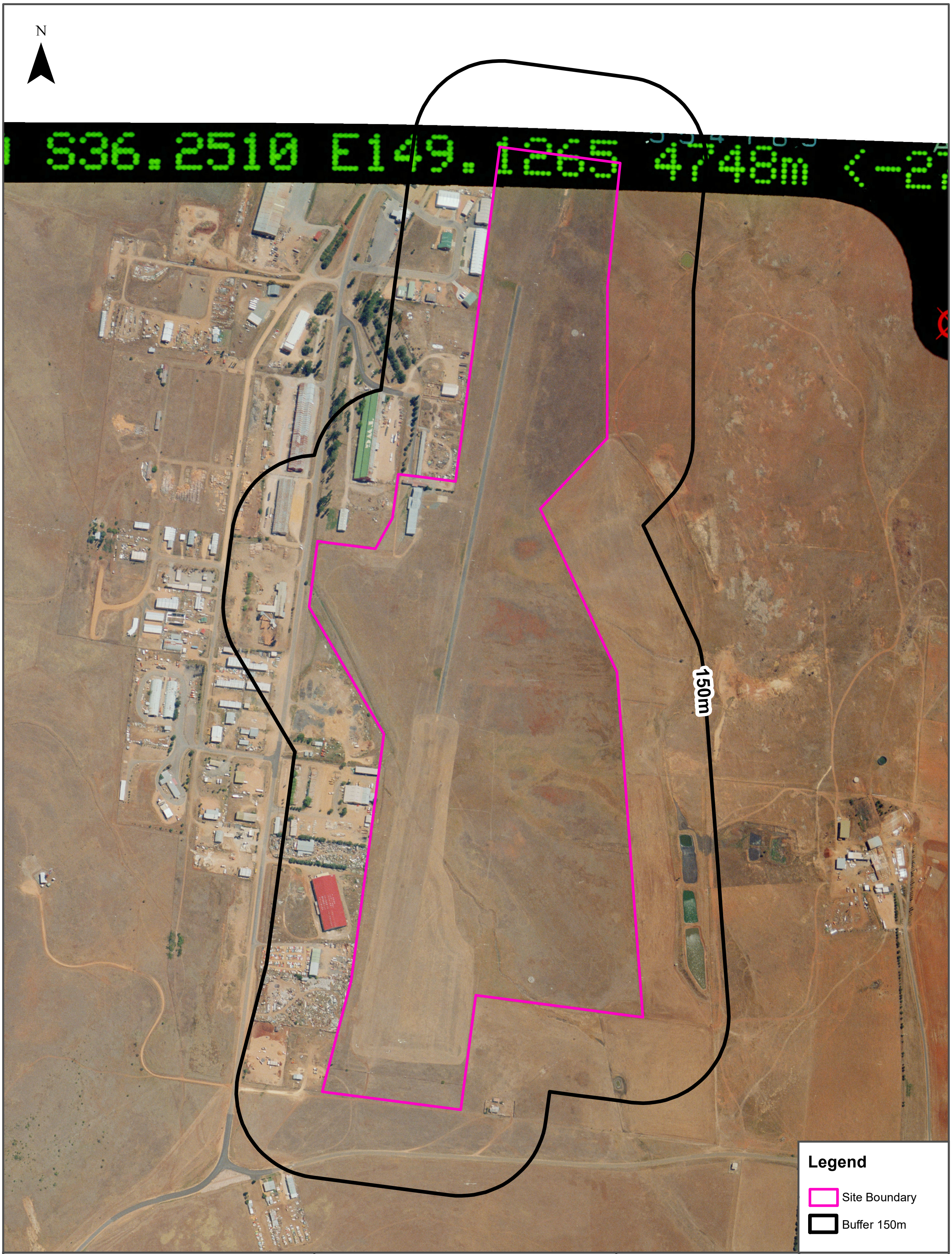
Data Source Aerial Imagery:
© NSW Department of Finance, Services & Innovation

Coordinate System:
GDA 1994 MGA Zone 56

Date: 12 March 2019

Aerial Imagery 1998

Polo Flat Road, Cooma, NSW 2630



Legend

🟪 Site Boundary

⬛ Buffer 150m

Scale:

0 100 200 400
Meters

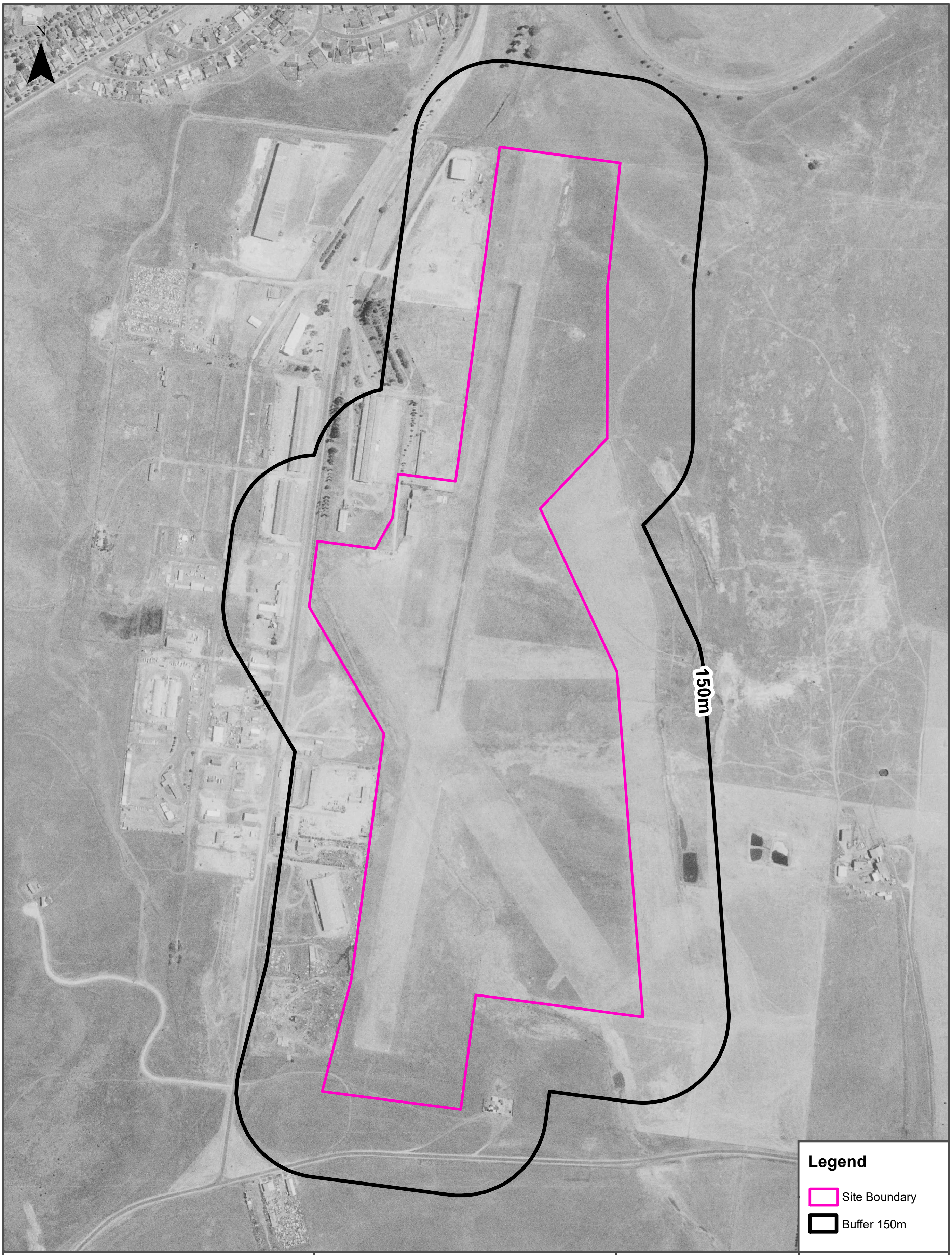
Data Source Aerial Imagery:
© NSW Department of Finance, Services & Innovation

Coordinate System:
GDA 1994 MGA Zone 56

Date: 12 March 2019

Aerial Imagery 1985

Polo Flat Road, Cooma, NSW 2630



Legend

🟪 Site Boundary

⬛ Buffer 150m

Scale:

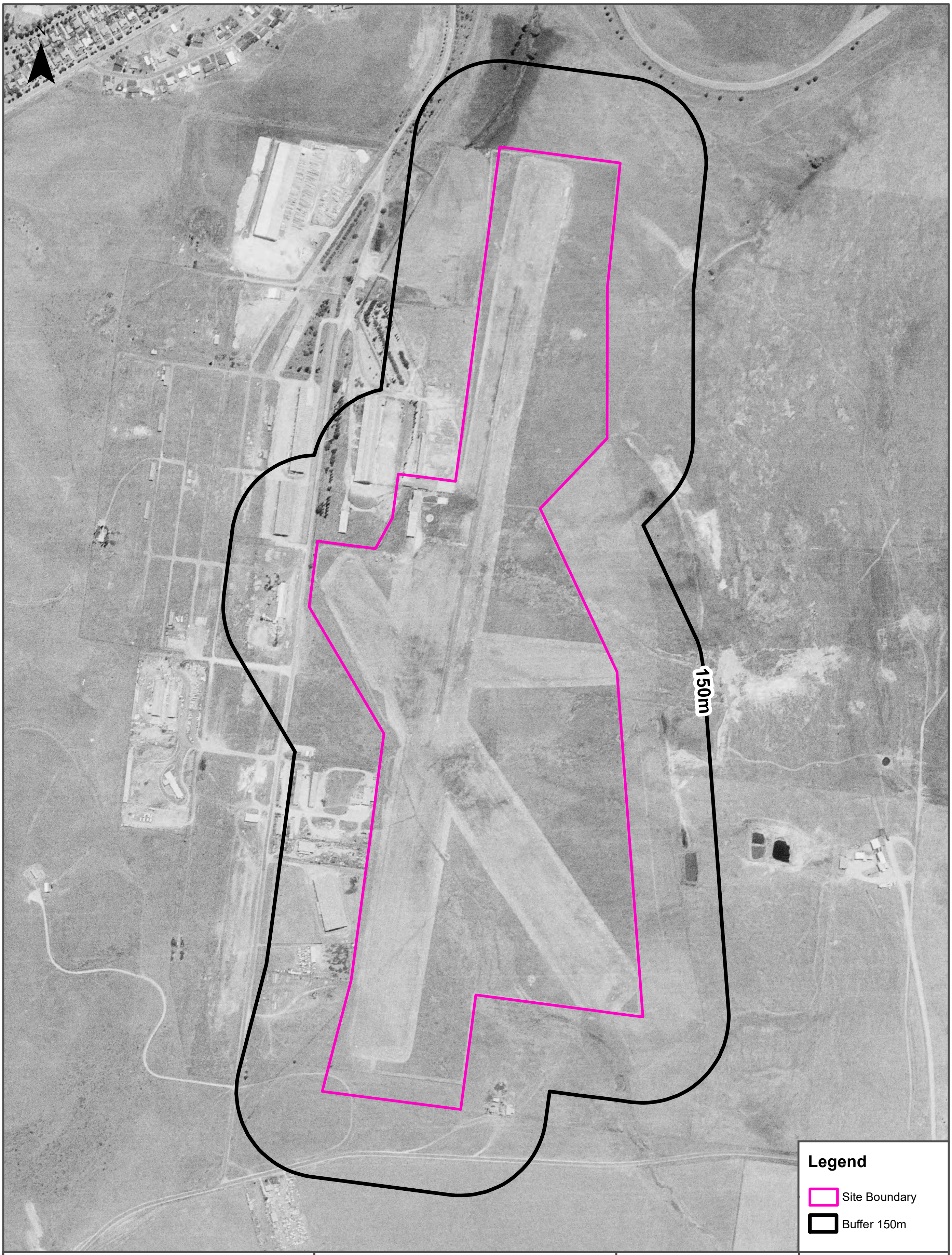
Data Source Aerial Imagery:
© NSW Department of Finance, Services & Innovation

Coordinate System:
GDA 1994 MGA Zone 56

Date: 12 March 2019

Aerial Imagery 1977

Polo Flat Road, Cooma, NSW 2630



Scale:
0 100 200 400
Meters

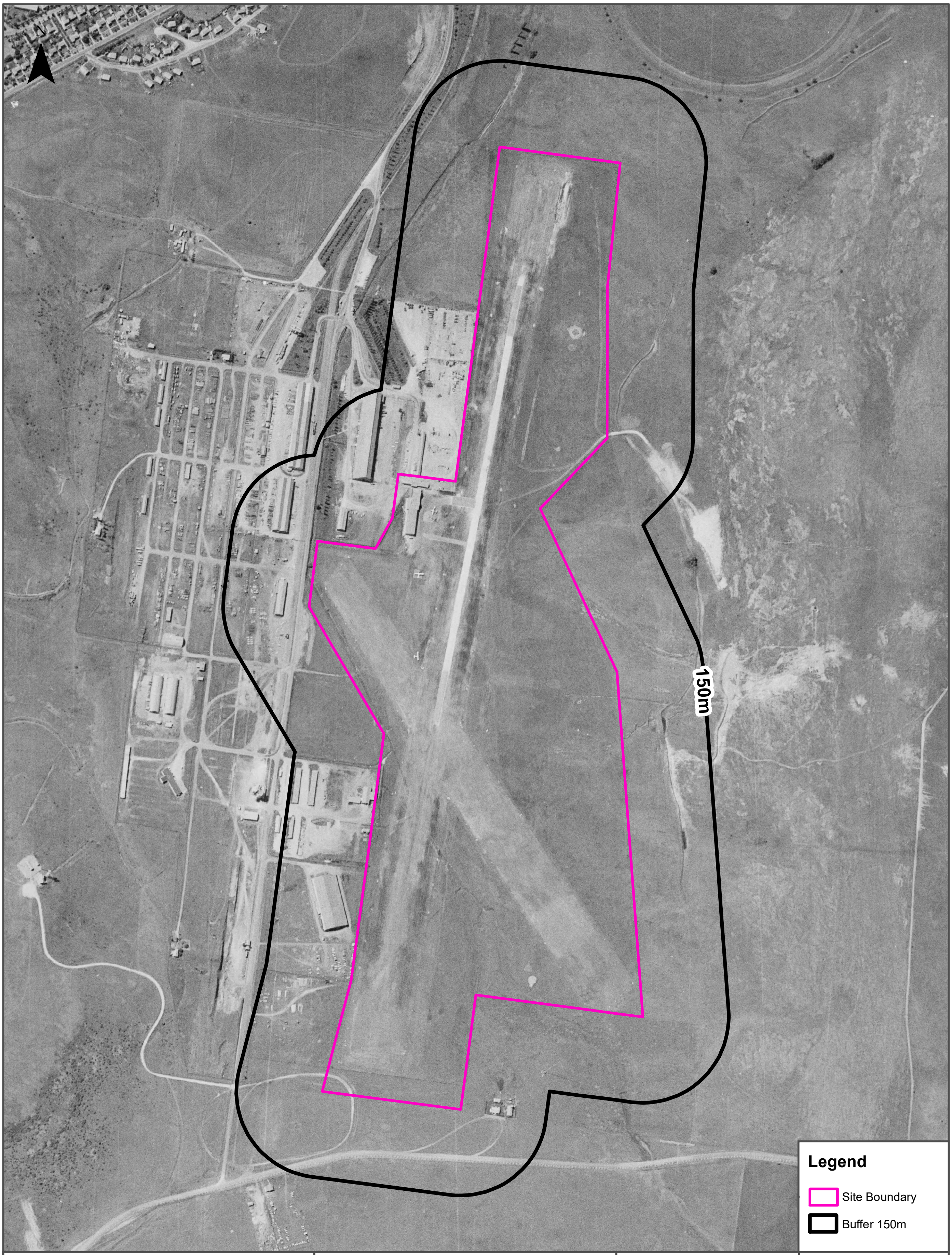
Data Source Aerial Imagery:
© NSW Department of Finance, Services & Innovation

Coordinate System:
GDA 1994 MGA Zone 56

Date: 12 March 2019

Aerial Imagery 1967

Polo Flat Road, Cooma, NSW 2630



Legend

🟪	Site Boundary
⬛	Buffer 150m

Scale:
0 100 200 400
Meters

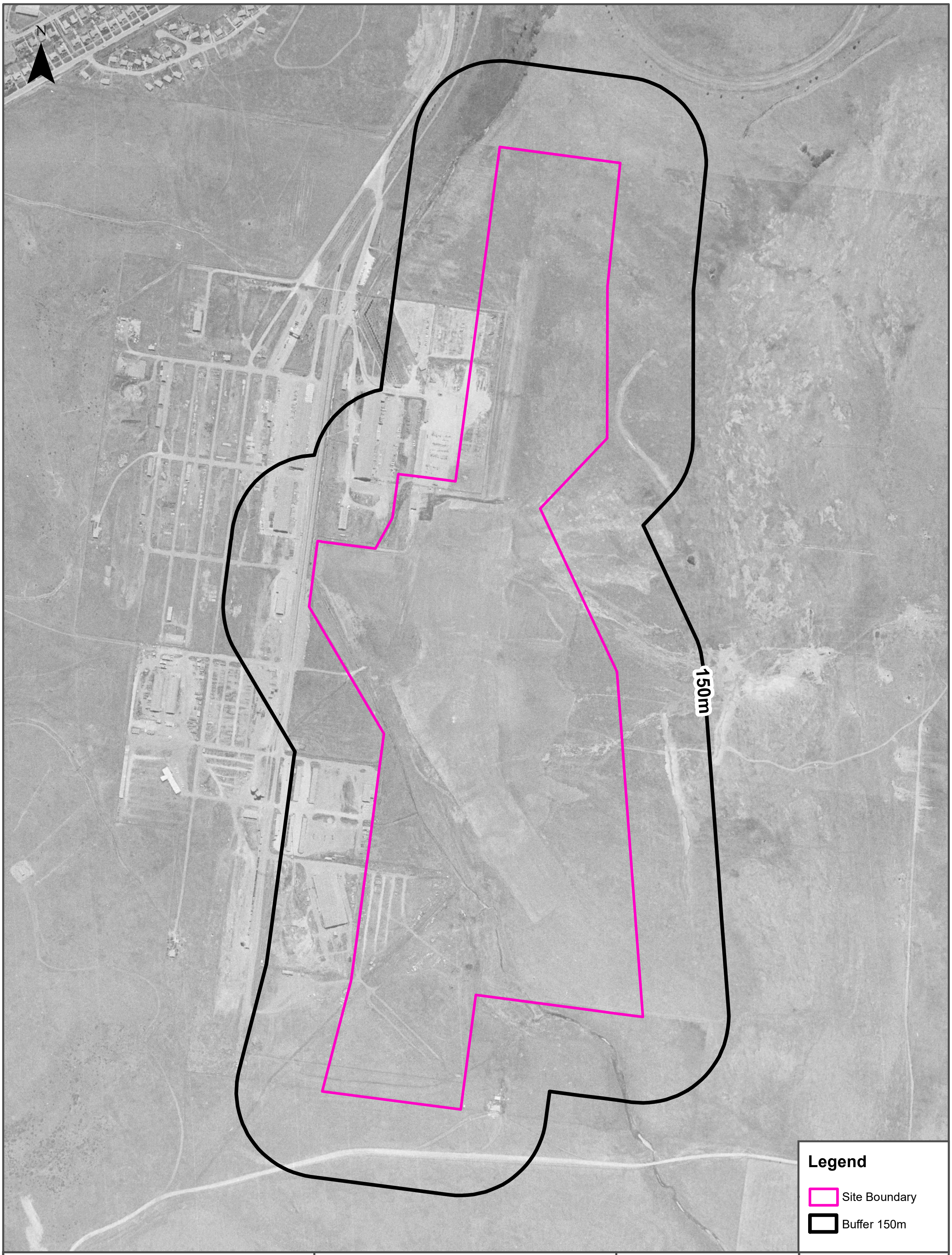
Data Source Aerial Imagery:
© NSW Department of Finance, Services & Innovation

Coordinate System:
GDA 1994 MGA Zone 56

Date: 12 March 2019

Aerial Imagery 1960

Polo Flat Road, Cooma, NSW 2630



Legend

🟪	Site Boundary
⬛	Buffer 150m

Scale:
0 100 200 400
Meters

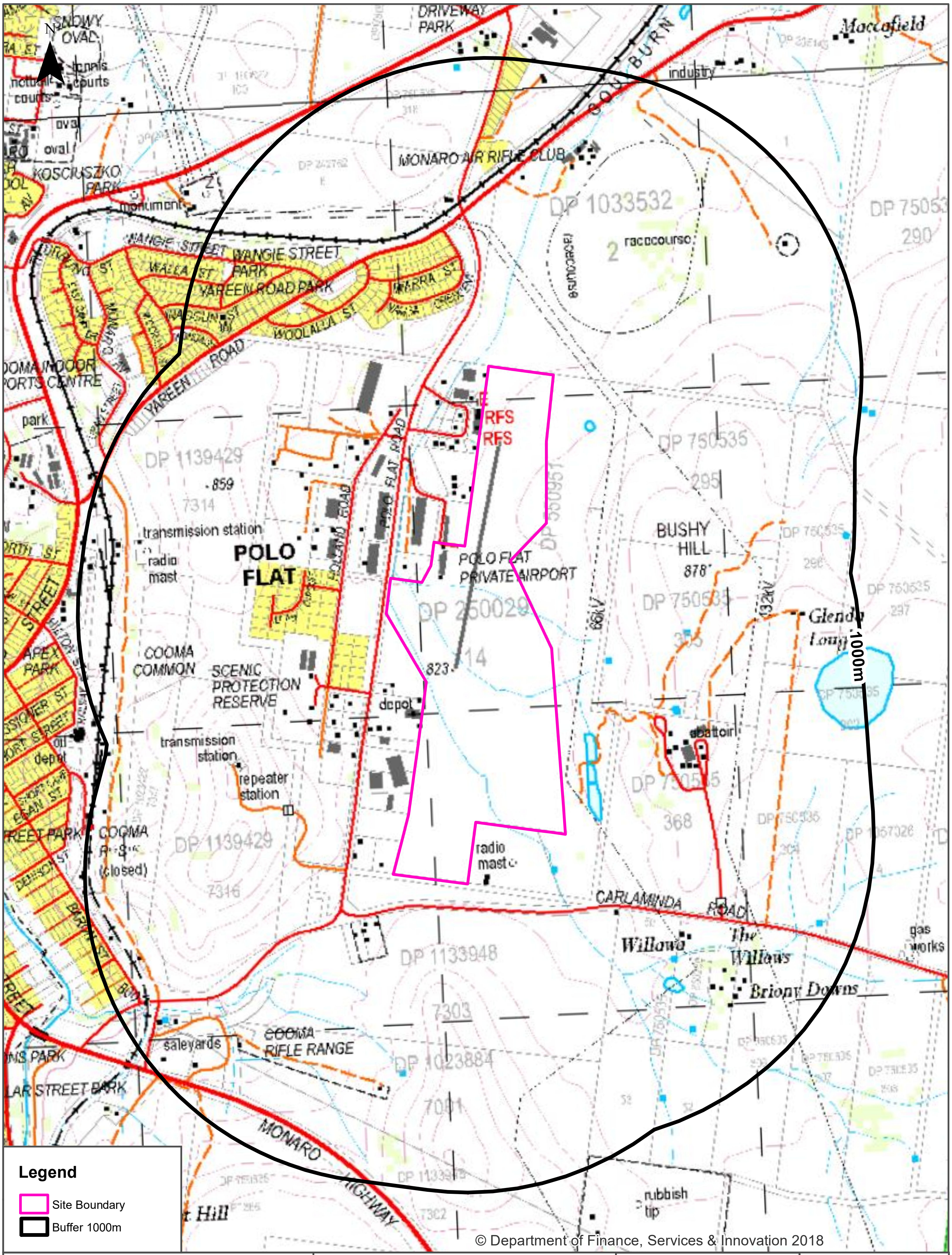
Data Source Aerial Imagery:
© NSW Department of Finance, Services & Innovation

Coordinate System:
GDA 1994 MGA Zone 56

Date: 12 March 2019

Topographic Map 2015

Polo Flat Road, Cooma, NSW 2630



© Department of Finance, Services & Innovation 2018

Scale: 0 100 200 400 600 800 Meters

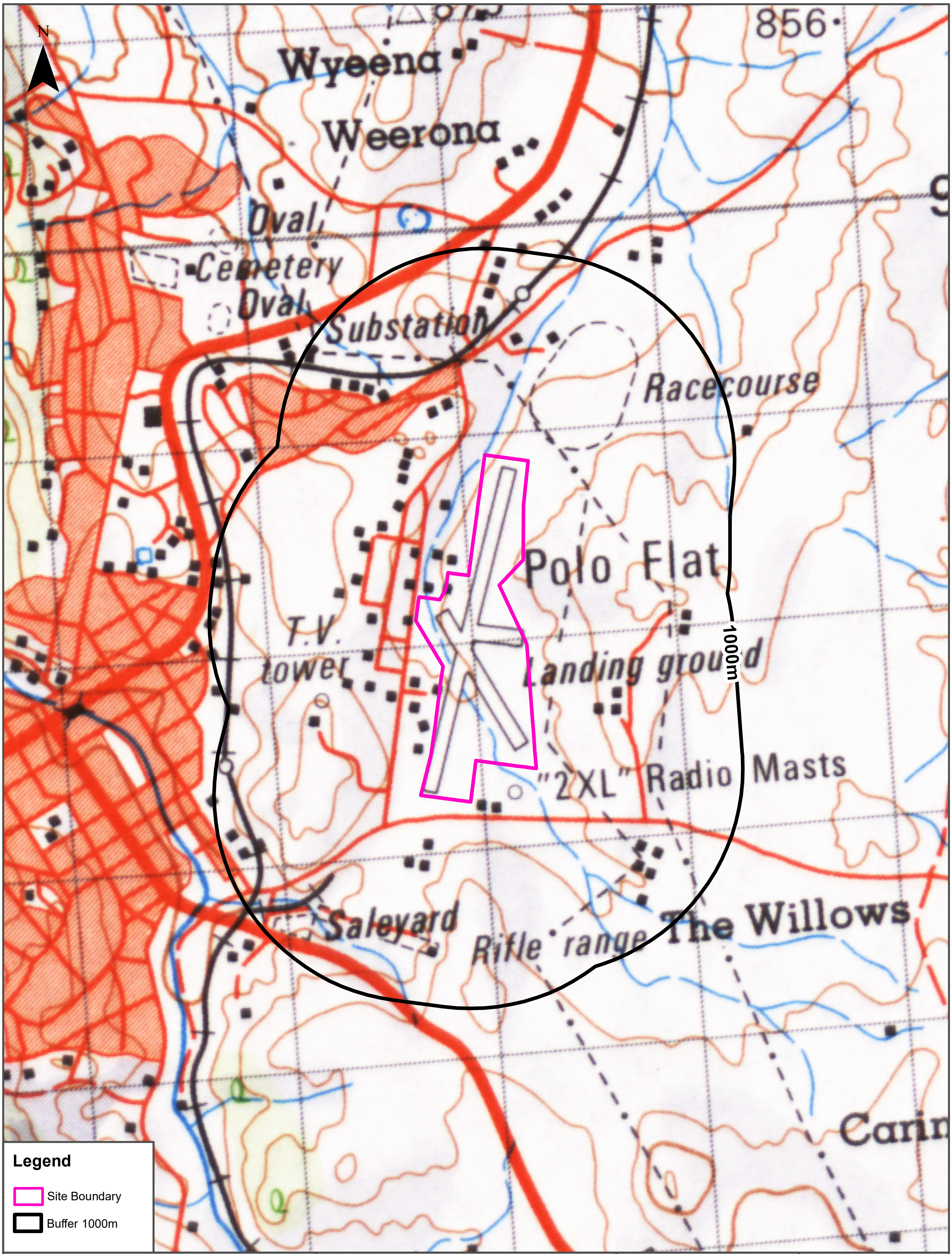
Data Sources: Topographic Map Data
© NSW Land and Property Information

Coordinate System:
GDA 1994 MGA Zone 56

Date: 13 March 2019

Historical Map 1977

Polo Flat Road, Cooma, NSW 2630



Legend

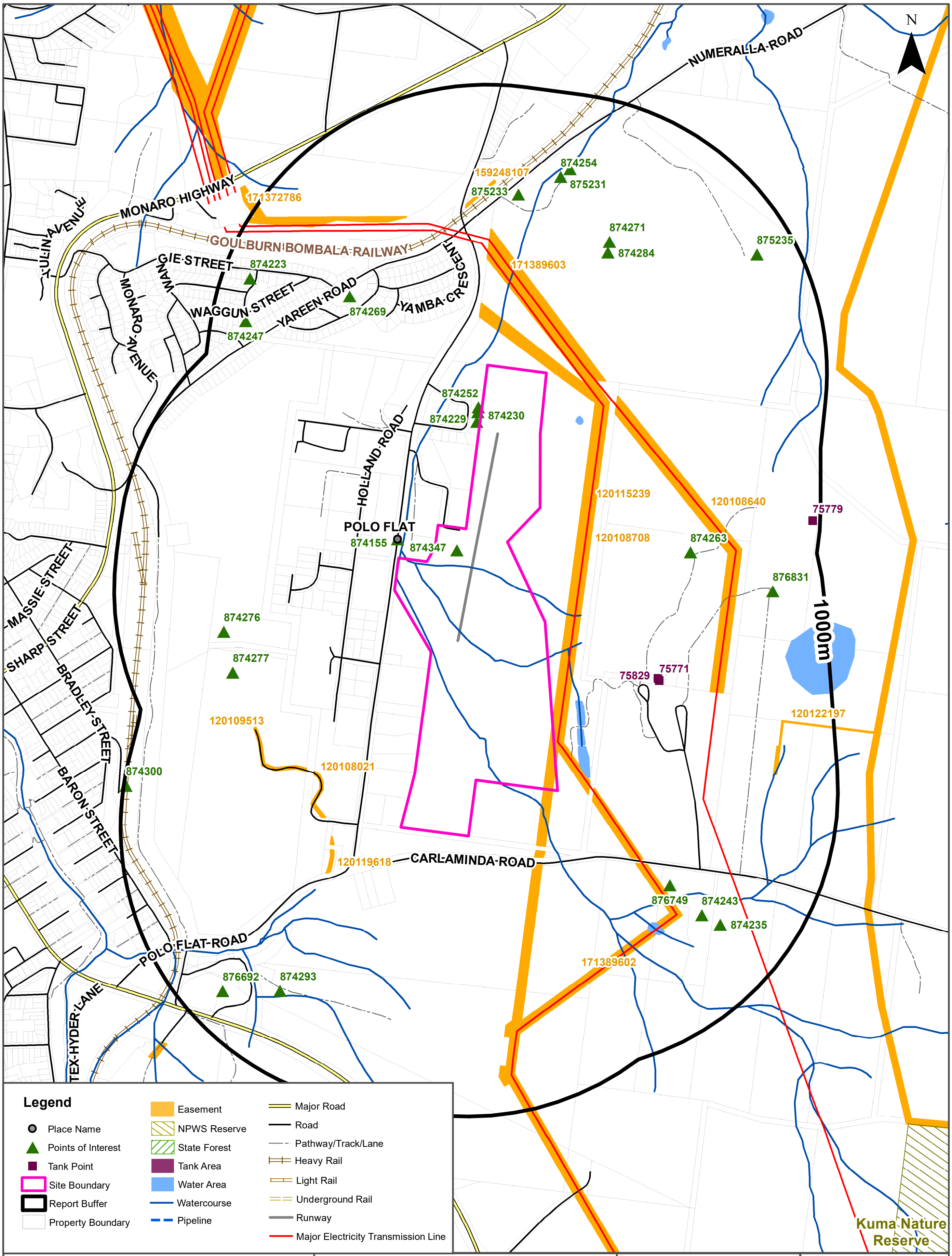
🟪 Site Boundary

⬛ Buffer 1000m

Scale: 0 200 400 800 1,200 Metres	Data Sources: NATMAP 1:100,000 Topographic Maps Geoscience Australia	Coordinate System: GDA 1994 MGA Zone 56	Date: 13 March 2019

Topographic Features

Polo Flat Road, Cooma, NSW 2630



Scale: 0 100 200 400 600 800 Meters

Data Sources: Property Boundaries & Topographic Data:
© Department Finance, Services & Innovation 2019

Coordinate System:
GDA 1994 MGA Zone 56

Date: 13 March 2019

Topographic Features

Polo Flat Road, Cooma, NSW 2630

Points of Interest

What Points of Interest exist within the dataset buffer?

Map Id	Feature Type	Label	Distance	Direction
874347	Airport	POLO FLAT PRIVATE AIRPORT	0m	Onsite
874229	Firestation - Bush	COOMA RFB	12m	North
874230	Firestation - Bush	COOMA-MONARO FIRE CONTROL CENTRE	13m	North
874252	SES Facility	COOMA-MONARO SES	13m	North
874155	Village	POLO FLAT	67m	North West
874284	Racecourse	TI-TREE RACECOURSE	482m	North
874271	Park	TI-TREE RECREATION RESERVE	519m	North
876749	Homestead	WILLAWA	523m	South East
874269	Park	YAREEN ROAD PARK	550m	North
874263	Mountain/Hill/Peak	BUSHY HILL	559m	East
875233	Community Facility	COOMA PONY CLUB	618m	North
874276	Park	COOMA COMMON	626m	West
874277	Park	SCENIC PROTECTION RESERVE	647m	West
874243	Homestead	THE WILLOWS	679m	South East
874254	Sports Centre	MONARO AIR RIFLE CLUB	700m	North
874293	Target Range	COOMA RIFLE RANGE	725m	South West
875231	Community Facility	COOMA BOCCE SPORTING CLUB	732m	North
874235	Homestead	BRIONY DOWNS	750m	South East
876831	Homestead	GLENDA LOUGH	819m	East
875235	Community Facility	COOMA REMOTE CONTROL MODEL AEROPLANE CLUB	862m	North East
876692	Stock Sale Yard	COOMA-MONARO REGIONAL SALEYARDS	863m	South West
874247	Place Of Worship	BRETHREN CHURCH	877m	North West
874223	Park	WANGIE STREET PARK	902m	North West
874300	Railway Station	COOMA RAILWAY STATION	991m	South West

Topographic Data Source: © Land and Property Information (2015)

Topographic Features

Polo Flat Road, Cooma, NSW 2630

Tanks (Areas)

What are the Tank Areas located within the dataset buffer?
Note. The large majority of tank features provided by LPI are derived from aerial imagery & are therefore primarily above ground tanks.

Map Id	Tank Type	Status	Name	Feature Currency	Distance	Direction
	No records in buffer					

Tanks (Points)

What are the Tank Points located within the dataset buffer?
Note. The large majority of tank features provided by LPI are derived from aerial imagery & are therefore primarily above ground tanks.

Map Id	Tank Type	Status	Name	Feature Currency	Distance	Direction
75829	Water	Operational		03/01/2009	387m	East
75771	Water	Operational		03/01/2009	391m	East
75779	Water	Operational		08/05/2001	973m	East

Tanks Data Source: © Land and Property Information (2015)

Major Easements

What Major Easements exist within the dataset buffer?
Note. Easements provided by LPI are not at the detail of local governments. They are limited to major easements such as Right of Carriageway, Electrical Lines (66kVa etc.), Easement to drain water & Significant subterranean pipelines (gas, water etc.).

Map Id	Easement Class	Easement Type	Easement Width	Distance	Direction
120115239	Primary	Undefined		0m	Onsite
120108708	Primary	Undefined		0m	South East
171389603	Primary	Electricity	30m	88m	North
120108640	Primary	Undefined		92m	South East
120119618	Primary	Undefined		247m	South West
120108021	Primary	Undefined		272m	South West
120109513	Primary	Undefined		378m	South West
159248107	Primary	Right of way	5.795m	569m	North
171389602	Primary	Electricity	30m & 50m	645m	South
120122197	Primary	Undefined		773m	East
171372786	Primary	Electricity	30m & Var	877m	North West

Easements Data Source: © Land and Property Information (2015)

Topographic Features

Polo Flat Road, Cooma, NSW 2630

State Forest

What State Forest exist within the dataset buffer?

State Forest Number	State Forest Name	Distance	Direction
N/A	No records in buffer		

State Forest Data Source: © NSW Department of Finance, Services & Innovation (2018)

National Parks and Wildlife Service Reserves

What NPWS Reserves exist within the dataset buffer?

Reserve Number	Reserve Type	Reserve Name	Gazetted Date	Distance	Direction
N/A	No records in buffer				

NPWS Data Source: © NSW Department of Finance, Services & Innovation (2018)

Elevation Contours (m AHD)

Polo Flat Road, Cooma, NSW 2630

Legend

— Elevation Contour (m AHD)

▢ Site Boundary

■ Report Buffer

▢ Property Boundary

Accuracy & Currency: This contour data can be up to 0.4 of the contour interval out in height and must therefore not be used for any design or engineering works, but only as a general guide to topography. Gaps may occur along contour lines due to vertical topography, obscured topography in the source photography such as buildings, dense vegetation or dead ground, or the fact that original buildings have been replaced in the intervening thirty years since the original contour capture.

Scale:

0 100 200 400
Meters

Data Sources: Property Boundaries & Topographic Data:
© Department Finance, Services & Innovation 2019

Coordinate System:
GDA 1994 MGA Zone 56

Date: 13 March 2019

Hydrogeology & Groundwater

Polo Flat Road, Cooma, NSW 2630

Hydrogeology

Description of aquifers on-site:

Description
Fractured or fissured, extensive aquifers of low to moderate productivity

Description of aquifers within the dataset buffer:

Description
Fractured or fissured, extensive aquifers of low to moderate productivity

Hydrogeology Map of Australia : Commonwealth of Australia (Geoscience Australia)

Botany Groundwater Management Zones

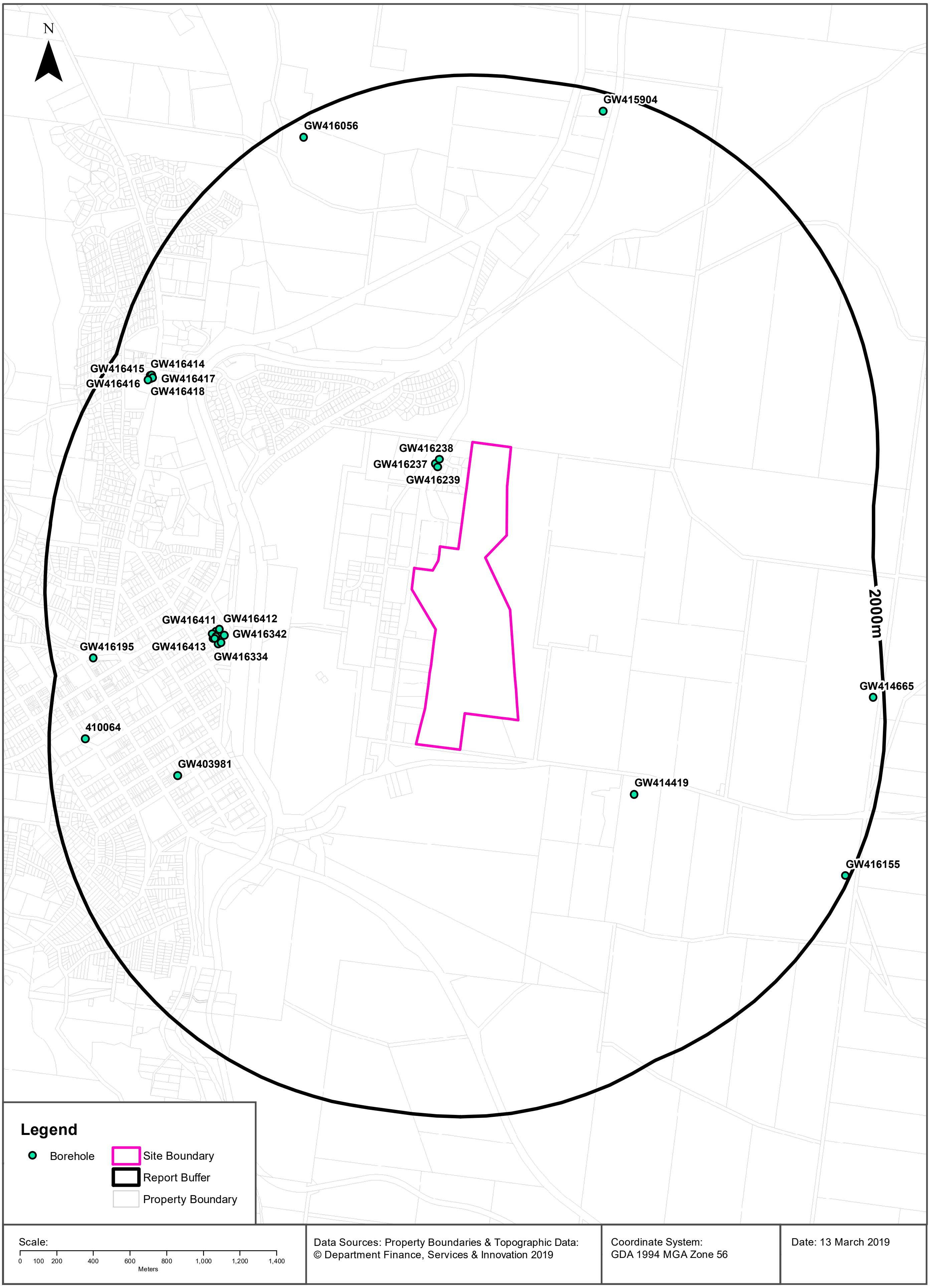
Groundwater management zones relating to the Botany Sand Beds aquifer within the dataset buffer:

Management Zone No.	Restriction	Distance	Direction
N/A	No records in buffer		

Botany Groundwater Management Zones Data Source : NSW Department of Primary Industries

Groundwater Boreholes

Polo Flat Road, Cooma, NSW 2630



Data Sources: Property Boundaries & Topographic Data:
© Department Finance, Services & Innovation 2019

Coordinate System:
GDA 1994 MGA Zone 56

Date: 13 March 2019

Hydrogeology & Groundwater

Polo Flat Road, Cooma, NSW 2630

Groundwater Boreholes

Boreholes within the dataset buffer:

GW No.	Licence No	Work Type	Owner Type	Authorised Purpose	Intended Purpose	Name	Complete Date	Final Depth (m)	Drilled Depth (m)	Salinity (mg/L)	SWL (m)	Yield (L/s)	Elev (AHD)	Dist	Dir
GW416238	40BL192613	Bore	Private	Monitoring Bore	Monitoring Bore	'Truck Stop' - MW2	23/04/2013	6.00	6.00		3.00			165m	North
GW416239	40BL192613	Bore	Private	Monitoring Bore	Monitoring Bore	'Truck Stop' - MW3	23/04/2013	2.80	2.80					170m	North
GW416237	40BL192613	Bore	Private	Monitoring Bore	Monitoring Bore	'Truck Stop' - MW1	23/04/2013	6.00	6.00		3.50			184m	North
GW414419	40BL192280	Bore	Private	Domestic, Stock	Domestic, Stock		07/05/2010	42.00	42.00		2.00	0.825		751m	South East
GW416342	40BL192583	Bore	Private	Monitoring Bore	Monitoring Bore		09/08/2011	13.00	13.00					1052m	West
GW416412	40BL192583	Bore	Private	Monitoring Bore	Monitoring Bore		22/02/2012	3.00	3.00					1069m	West
GW416341	40BL192583	Bore	Private	Monitoring Bore			06/11/2013	10.00	10.00					1069m	West
GW416371	40BL192583	Bore	Private	Monitoring Bore	Monitoring Bore		09/08/2011	11.50	11.50					1079m	West
GW416335	40BL192583	Bore	Private	Monitoring Bore	Monitoring Bore		09/08/2011	14.50	14.50					1085m	West
GW416411	40BL192583	Bore	Private	Monitoring Bore	Monitoring Bore		21/02/2012	13.00	13.00					1089m	West
GW416334	40BL192583	Bore	Private	Monitoring Bore	Monitoring Bore		09/08/2011	10.00	10.00					1096m	West
GW416297	40BL192583	Bore	Private	Monitoring Bore	Monitoring Bore		08/08/2011	15.00						1097m	West
GW416318	40BL192583	Bore	Private	Monitoring Bore	Monitoring Bore		09/08/2011	15.50	15.00					1106m	West
GW416408	40BL192583	Bore	Private	Monitoring Bore	Monitoring Bore		21/02/2012	12.00	12.00					1114m	West
GW416413	40BL192583	Bore	Private	Monitoring Bore	Monitoring Bore		06/09/2012	9.60	9.60					1116m	West
GW403981	40BL191289	Bore	Private	Domestic	Domestic		16/07/1993	30.00						1309m	South West
GW416417	40BL192617	Bore	Private	Monitoring Bore	Monitoring Bore	'Ampol - Cooma North - MW4'	05/09/2013	10.00	10.00		5.50			1761m	North West
GW416418	40BL192617	Bore	Private	Monitoring Bore	Monitoring Bore	'Ampol - Cooma North - MW5'	05/09/2013	14.00	14.00		5.60			1770m	North West
GW416415	40BL192617	Bore	Private	Monitoring Bore	Monitoring Bore	'Ampol - Cooma North - MW2'	05/09/2013	11.50	11.50		5.50			1775m	North West
GW416195	40BL192388	Bore	Private	Monitoring Bore	Monitoring Bore		10/09/2010	3.00	3.00					1775m	West
GW416416	40BL192617	Bore	Private	Monitoring Bore	Monitoring Bore	'Ampol - Cooma North - MW3'	06/09/2013	13.50	13.50		5.60			1777m	North West
GW416414	40BL192617	Bore	Private	Monitoring Bore	Monitoring Bore	'Ampol - Cooma North - MW1'	05/09/2013	15.00	15.00		5.50			1781m	North West
410064					UNK								805.00	1802m	West

GW No.	Licence No	Work Type	Owner Type	Authorised Purpose	Intended Purpose	Name	Complete Date	Final Depth (m)	Drilled Depth (m)	Salinity (mg/L)	SWL (m)	Yield (L/s)	Elev (AHD)	Dist	Dir
GW416056	40WA410727	Bore	Private	Domestic	Domestic		02/04/2005	48.00	48.00					1897m	North
GW415904	40BL192428	Bore	Private	Domestic	Domestic		10/08/2011	36.00	30.00		4.00	0.600		1899m	North
GW414665	40BL192564	Well	Private	Domestic, Stock	Domestic, Stock		01/01/1960	10.00	10.00					1941m	East
GW416155	40WA412427	Bore	Private	Domestic, Stock	Domestic, Stock		06/01/2013	36.00	36.00		4.00	0.500		1977m	South East

Borehole Data Source : NSW Department of Primary Industries - Office of Water / Water Administration Ministerial Corporation for all bores prefixed with GW. All other bores © Commonwealth of Australia (Bureau of Meteorology) 2015. Creative Commons 3.0 © Commonwealth of Australia http://creativecommons.org/licenses/by/3.0/au/deed.en

Hydrogeology & Groundwater

Polo Flat Road, Cooma, NSW 2630

Driller's Logs

Drill log data relevant to the boreholes within the dataset buffer:

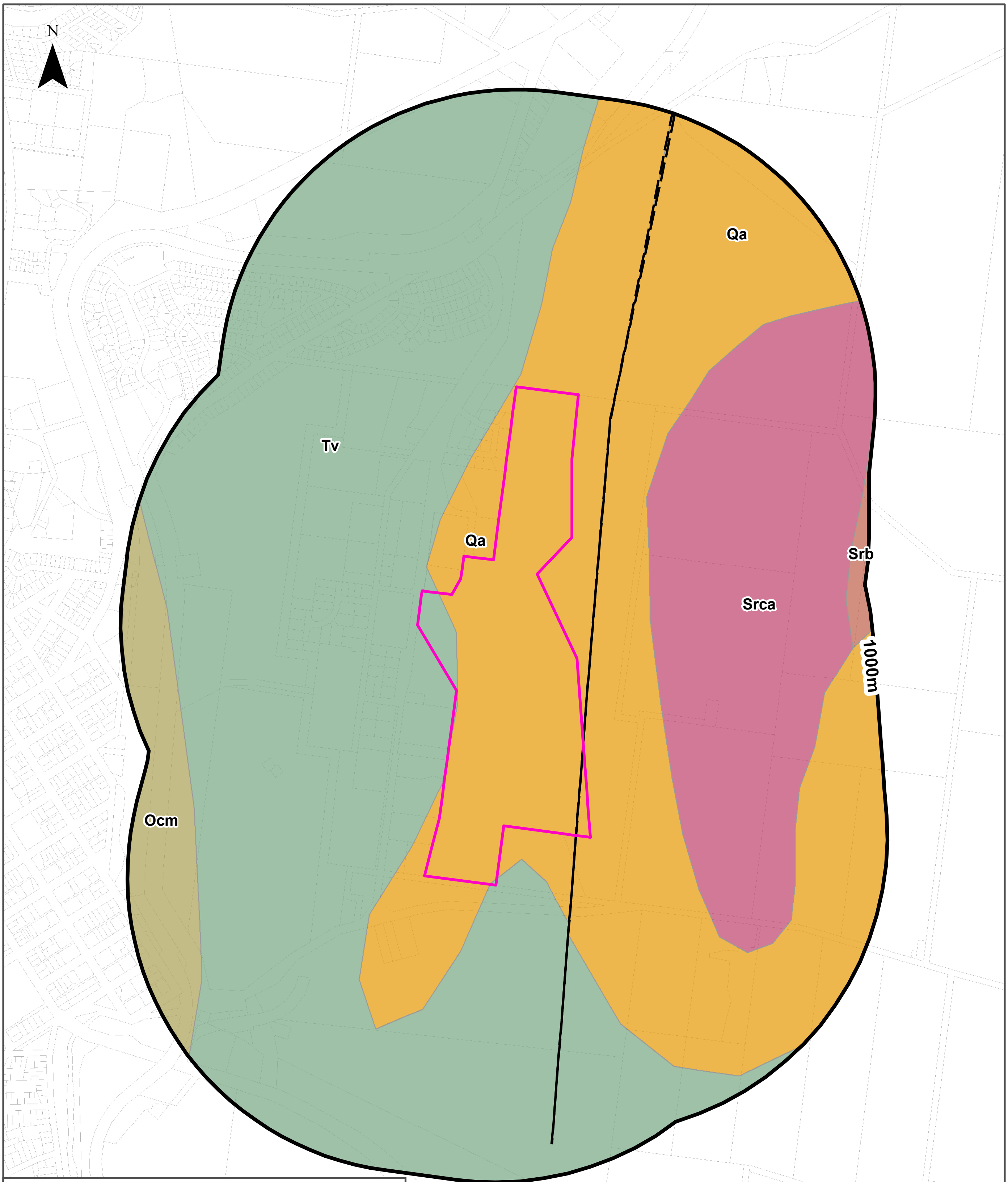
Groundwater No	Drillers Log	Distance	Direction
GW416238	0.00m-0.20m bitumen 0.20m-0.50m silt, sandy, orange, loose - trace gravel 0.50m-1.00m silty clay, with gravel, firm, brown 1.00m-2.50m silty clay, with gravel, firm and colour change - dark brown 2.50m-4.00m silty clay, firm, brown, trace gravel 4.00m-4.50m silty clay, firm, brown - trace gravel, groundwater encountered 4.50m-4.60m silty clay, firm to very stiff 4.60m-6.00m silty clay, end of hole	165m	North
GW416239	0.00m-0.30m concrete 0.30m-0.40m silt, clay, gravel, friable, dark brown 0.40m-1.00m silty clay, firm, dark brown, trace gravel 1.00m-2.50m silty clay, stiff and colour change, dark brown 2.50m-2.80m silty clay	170m	North
GW416237	0.00m-0.30m base, gravel 0.30m-0.50m silty clay, brown, friable - trace gravel 0.50m-1.00m silty clay, brown, firm - trace gravel 1.00m-4.00m silty clay, mottled, brown orange, firm - trace gravel 4.00m-4.50m silty clay, groundwater encountered 4.50m-5.00m silty clay, colour change - brown 5.00m-6.00m silty clay	184m	North
GW414419	0.00m-1.00m SOIL - CLAY - BROWN 1.00m-5.00m BASALT - SOFT - LIGHT GREY 5.00m-33.00m BASALT - BLACK 33.00m-36.00m SANDY CLAY - WHITE 36.00m-42.00m BASALT - BLACK	751m	South East
GW416342	0.00m-0.30m Sand, silty, fine grained 0.30m-0.40m Sand, med grained 0.40m-13.00m Schist, weathered grey	1052m	West
GW416341	0.00m-0.10m Bitamen 0.10m-0.30m Sand, gravelly, med brown 0.30m-10.00m Schist, weathered, grey	1069m	West
GW416412	0.00m-0.05m Bitamen 0.05m-3.00m Schist	1069m	West
GW416371	0.00m-11.50m Schist, weathered	1079m	West
GW416335	0.00m-0.10m Bitumen at surface 0.10m-0.70m Sand, silty 0.70m-14.50m Schist, weathered	1085m	West
GW416411	0.00m-0.25m Bitamen 0.25m-1.70m Fill 1.70m-4.70m Schist 4.70m-13.00m Silty clay	1089m	West
GW416334	0.00m-0.03m Sand, light brown 0.03m-10.00m Schist, weathered	1096m	West
GW416318	0.00m-0.05m Bitumen at surface 0.05m-0.40m Fill sandy Gravel 0.40m-1.30m Fill,gravelling Sand. 1.30m-15.00m Schist, bedrock	1106m	West
GW416408	0.00m-0.06m Bitamen 0.06m-12.00m Schist, differing degrees of hardness	1114m	West
GW416413	0.00m-0.16m Concrete 0.16m-0.26m Sand, gravelly 0.26m-9.60m Schist	1116m	West
GW416417	0.00m-1.80m granite, weathered 1.80m-10.00m granite, hard, dry, grey	1761m	North West

Groundwater No	Drillers Log	Distance	Direction
GW416418	0.00m-0.10m concrete 0.10m-8.20m granite, weathered, clayey sand, grey brown, dry to moist, fine to coarse grained sand 8.20m-14.00m granite, hard, dry, grey	1770m	North West
GW416195	0.00m-0.20m silt, sandy with minor gravel, fine to coarse grained, slightly moist, yellow - fill 0.20m-1.80m clay, firm, slightly moist, medium plasticity, black 1.80m-3.00m silty clay, very stiff, very moist to wet, low plasticity, black, dark brown	1775m	West
GW416415	0.00m-1.00m fill, gravelly clay and basalt, dark brown with pieces of basalt ranging from med gravel to cobbles, dry 1.00m-8.10m granite, weathered, grey brown, consistency of clayey sand, fine to coarse grained, moist 8.10m-11.50m granite, hard, grey, dry	1775m	North West
GW416416	0.00m-0.10m concrete 0.10m-4.90m granite, weathered, grey brown, comprised of fine to coarse grained sand, dry 4.90m-13.50m granite,hard, dry, grey	1777m	North West
GW416414	0.00m-2.00m fill, clayey sand, weathered granite, brown fine to coarse grained, moist 2.00m-4.00m clayey sand, weathered granite, brown, fine to coarse grained, dry 4.00m-5.30m Granite, weathered, grey, comprised of fine to coarse grained sand, dry 5.30m-6.80m Granite, weathered, grey brown, comprised of fine to coarse grained sand, dry 6.80m-15.00m granite, hard, dry, grey	1781m	North West
GW416056	0.00m-1.00m topsoil 1.00m-12.00m granite, soft 12.00m-48.00m granite	1897m	North
GW415904	0.00m-3.00m Clay 3.00m-11.00m Granite, decomposed 11.00m-24.00m Clay, grey granite 24.00m-30.00m Granite, grey and black	1899m	North
GW416155	0.00m-0.50m topsoil 0.50m-24.00m slate, grey blue 24.00m-25.00m slate, broken 25.00m-36.00m slate, hard, blue	1977m	South East

Drill Log Data Source: NSW Department of Primary Industries - Office of Water / Water Administration Ministerial Corp

Geology 1:250,000

Polo Flat Road, Cooma, NSW 2630



Legend

Site Boundary
Report Buffer
Property Boundary
Fault
Dyke
Fold
Marker Bed
Trend Line
Metamorphic Boundary
Shear Zone
Structure
Thrust Fault
Lineament

Scale:
0 100 200 400 600 800
Meters

Data Sources: Property Boundaries & Topographic Data:
© Department Finance, Services & Innovation 2019

Coordinate System:
GDA 1994 MGA Zone 56

Date: 13 March 2019

Geology

Polo Flat Road, Cooma, NSW 2630

Geological Units

What are the Geological Units onsite?

Symbol	Description	Unit Name	Group	Sub Group	Age	Dom Lith	Map Sheet	Dataset
Qa7	Alluvium, fluvial deposits: gravel, sand, silt and clay	undifferentiated			Cainozoic			1:250,000
Tv7	Basalt, olivine basalt	undifferentiated			Cainozoic			1:250,000

What are the Geological Units within the dataset buffer?

Symbol	Description	Unit Name	Group	Sub Group	Age	Dom Lith	Map Sheet	Dataset
Ocm	Mica schist, biotite schist, andalusite-Sillimanite bearing schist, orthoclase-Cordierite knotted schists		Cooma Metamorphic Complex		Palaeozoic			1:250,000
Qa	Alluvium, fluvial deposits: gravel, sand, silt and clay	undifferentiated			Cainozoic			1:250,000
Srb	Coarse rhyolite porphyry	Bullanamang Porphyry	Bredbo Group		Palaeozoic			1:250,000
Srca	Sheared, medium-grained crystal-rich dacitic volcanics	Colinton Volcanics	Bredbo Group		Palaeozoic			1:250,000
Tv	Basalt, olivine basalt	undifferentiated			Cainozoic			1:250,000

Geological Structures

What are the Geological Structures onsite?

Feature	Name	Description	Map Sheet	Dataset
Fault		Thrust, Approximate	Bega_Mallacoota	1:250,000
Fault		Thrust, Approximate	SCRA	1:250,000

What are the Geological Structures within the dataset buffer?

Feature	Name	Description	Map Sheet	Dataset
Fault		Thrust, Approximate	Bega_Mallacoota	1:250,000
Fault		Thrust, Approximate	SCRA	1:250,000
Fault		Thrust, Approximate	SCRA	1:250,000
Fault		Thrust, Approximate	SCRA	1:250,000

Geological Data Source : NSW Department of Industry, Resources & Energy

Naturally Occurring Asbestos Potential

Polo Flat Road, Cooma, NSW 2630

Naturally Occurring Asbestos Potential

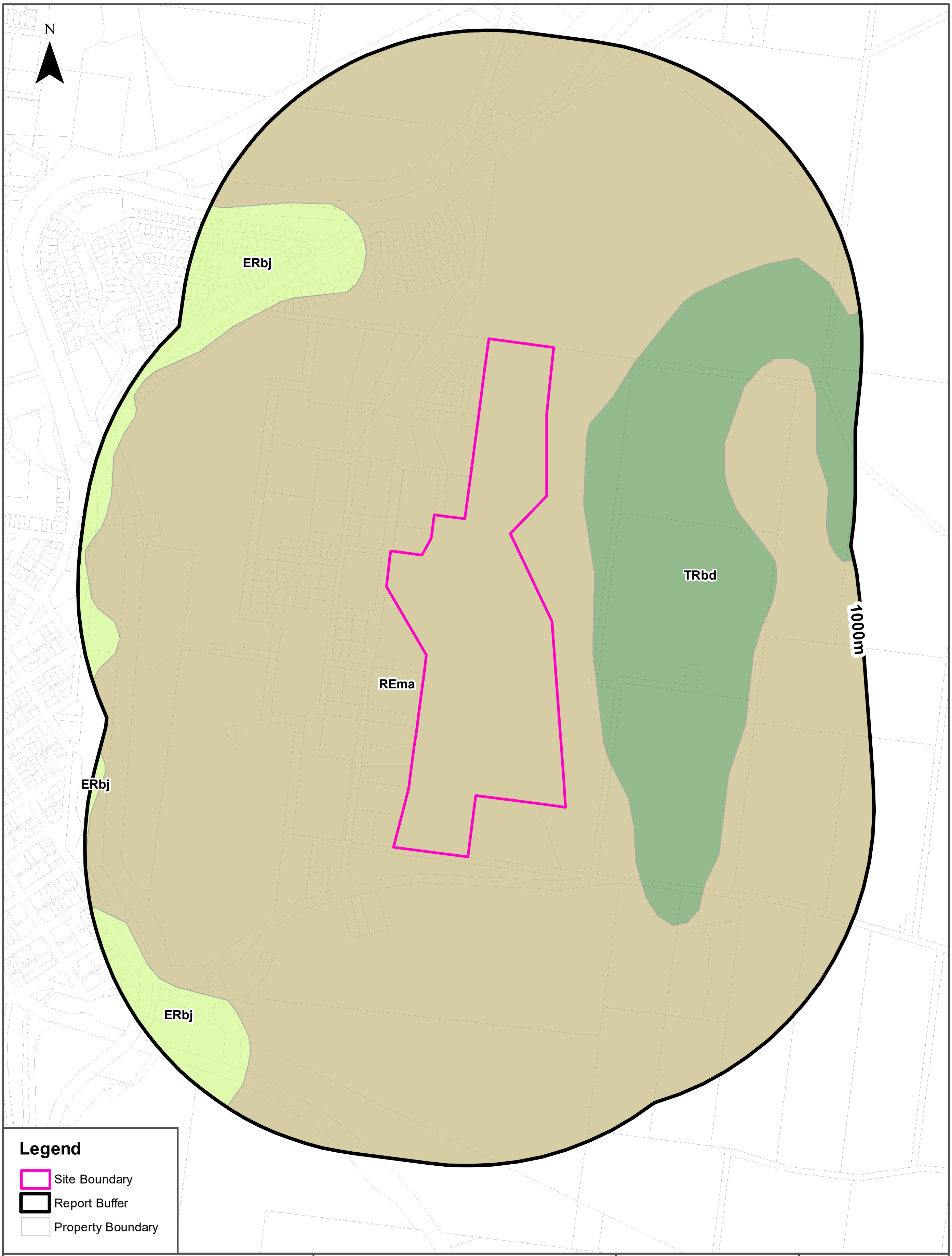
Naturally Occurring Asbestos Potential within the dataset buffer:

Potential	Sym	Strat Name	Group	Formation	Scale	Min Age	Max Age	Rock Type	Dom Lith	Description	Dist	Dir
No records in buffer												

Mining Subsidence District Data Source: © State of New South Wales through NSW Department of Industry, Resources & Energy

Soil Landscapes

Polo Flat Road, Cooma, NSW 2630



Legend

- ▭ Site Boundary
- ▭ Report Buffer
- ▭ Property Boundary

Scale:

Data Sources: Property Boundaries & Topographic Data:
© Department Finance, Services & Innovation 2019

Coordinate System:
GDA 1994 MGA Zone 56

Date: 13 March 2019

Soils

Polo Flat Road, Cooma, NSW 2630

Soil Landscapes

What are the onsite Soil Landscapes?

Soil Code	Name	Group	Process	Map Sheet	Scale
REma	MANEROO		RESIDUAL	Cooma	1:100,000

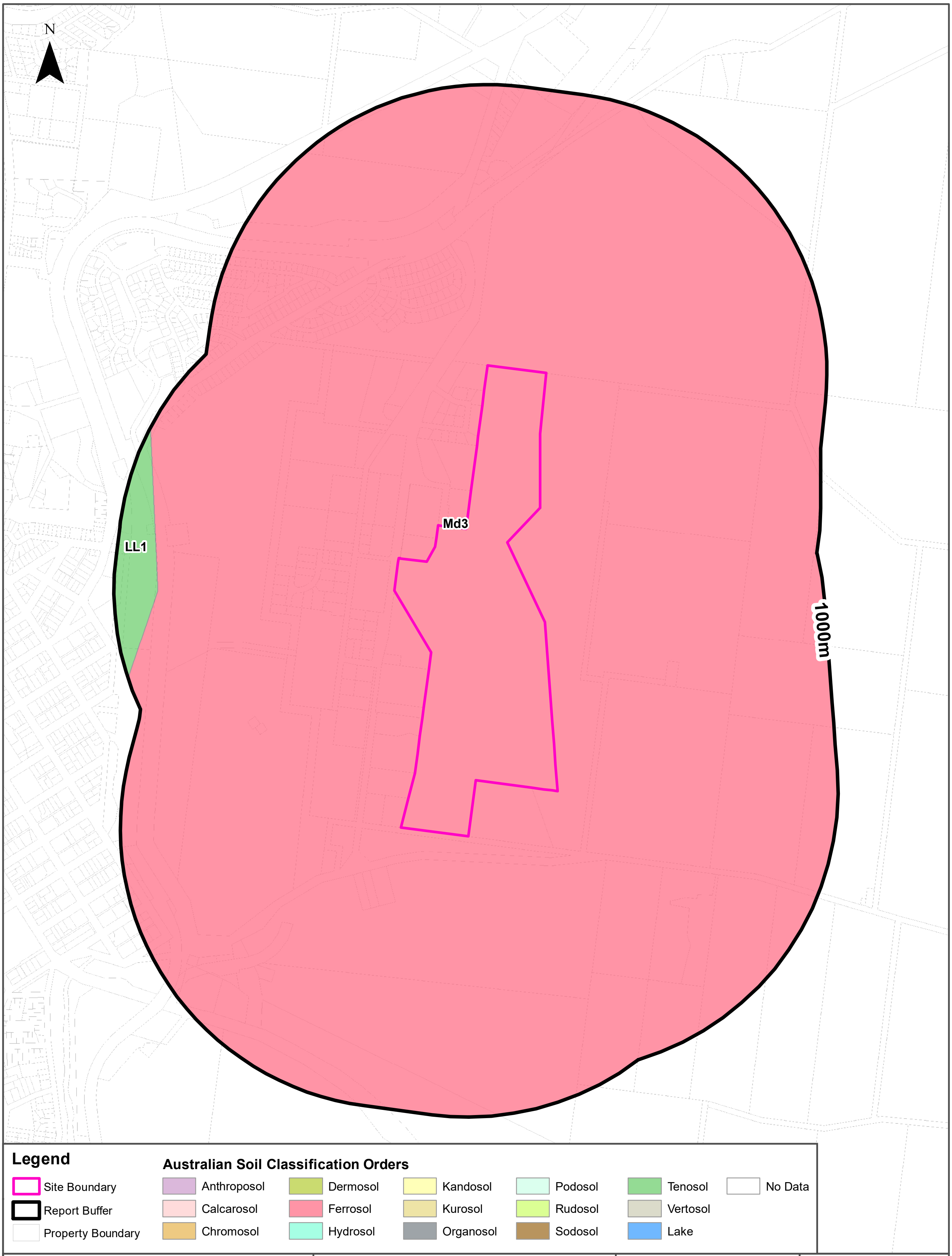
What are the Soil Landscapes within the dataset buffer?

Soil Code	Name	Group	Process	Map Sheet	Scale
ERbj	BINJURA		EROSIONAL	Cooma	1:100,000
REma	MANEROO		RESIDUAL	Cooma	1:100,000
TRbd	BREDBO		TRANSFERRAL	Cooma	1:100,000

Soils Landscapes Data Source : NSW Office of Environment and Heritage

Atlas of Australian Soils

Polo Flat Road, Cooma, NSW 2630



Scale:

Data Sources: Property Boundaries & Topographic Data:
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Coordinate System:
GDA 1994 MGA Zone 56

Date: 13 March 2019

Soils

Polo Flat Road, Cooma, NSW 2630

Atlas of Australian Soils

Soil mapping units and Australian Soil Classification orders within the dataset buffer:

Map Unit Code	Soil Order	Map Unit Description	Distance
Md3	Ferrosol	Undulating to hilly dissected tableland with some rounded hills, flat-topped ridges, and small valley plains; a multicyclic erosional landscape: upper slopes generally and ridge tops of red and brown friable earths (Gn3.12 and Gn3.22) with friable neutral red soils (Dr4.12) in association with cracking clays (Ug5.1, especially Ug5.12, Ug5.13, and Ug5.15) on mid and lower slopes, and also some dark friable earths (Gn3.41) on lower slopes, and in association with valley plains of various cracking clays (Ug5.1); hard neutral red soils (Dr2.12) occur on the crests of some hills; stony dark porous loamy soils (Um6.21) occur on some lower hill slopes; also other soils described from the area apparently code as (Dd3.11 and Dd3.12), (Um6.1), and (Ug5.2).	0m
LL1	Tenosol	Hills and plains--multicyclic erosional landscape of hills and hillocky areas with intervening plain-like areas, the whole traversed and dissected by variously incised stream valleys--some layering of soil materials: (i) relatively higher hills and ranges of loamy soils having an A2 horizon (Um4.2) and yellow-brown earths (Gn2.44) with (Um5.41 and Um5.S1), many stones, and rock outcrops; gullies of (Dr2) and (Dy3.32 and Dy3.42) soils; (ii) relatively lower hills and hillocky areas of hard acidic red soils (Dr2.21) and (Uc6.11), (Um) soils and rock outcrops with (Dy3.4) soils on lower slopes and (Dy3.43) in depressions; (iii) undulating plain-like areas with slopes and benches of red and yellow earths including (Gn2.14, Gn2.15, and Gn2.24); (iv) stream valleys of (Um6.11), some with clay D horizons and other (Uc) and (Um) soils; (v) also remains of various soil materials such as ironstone boulders in various situations. Soil dominance is difficult to assess: the most common soils are likely to be the (D) soils as a group but their variety is such that no single (D) soil can, on present data, be regarded as dominant.	842m

Atlas of Australian Soils Data Source: CSIRO

Acid Sulfate Soils

Polo Flat Road, Cooma, NSW 2630

Environmental Planning Instrument - Acid Sulfate Soils

What is the on-site Acid Sulfate Soil Plan Class that presents the largest environmental risk?

Soil Class	Description	EPI Name
N/A		

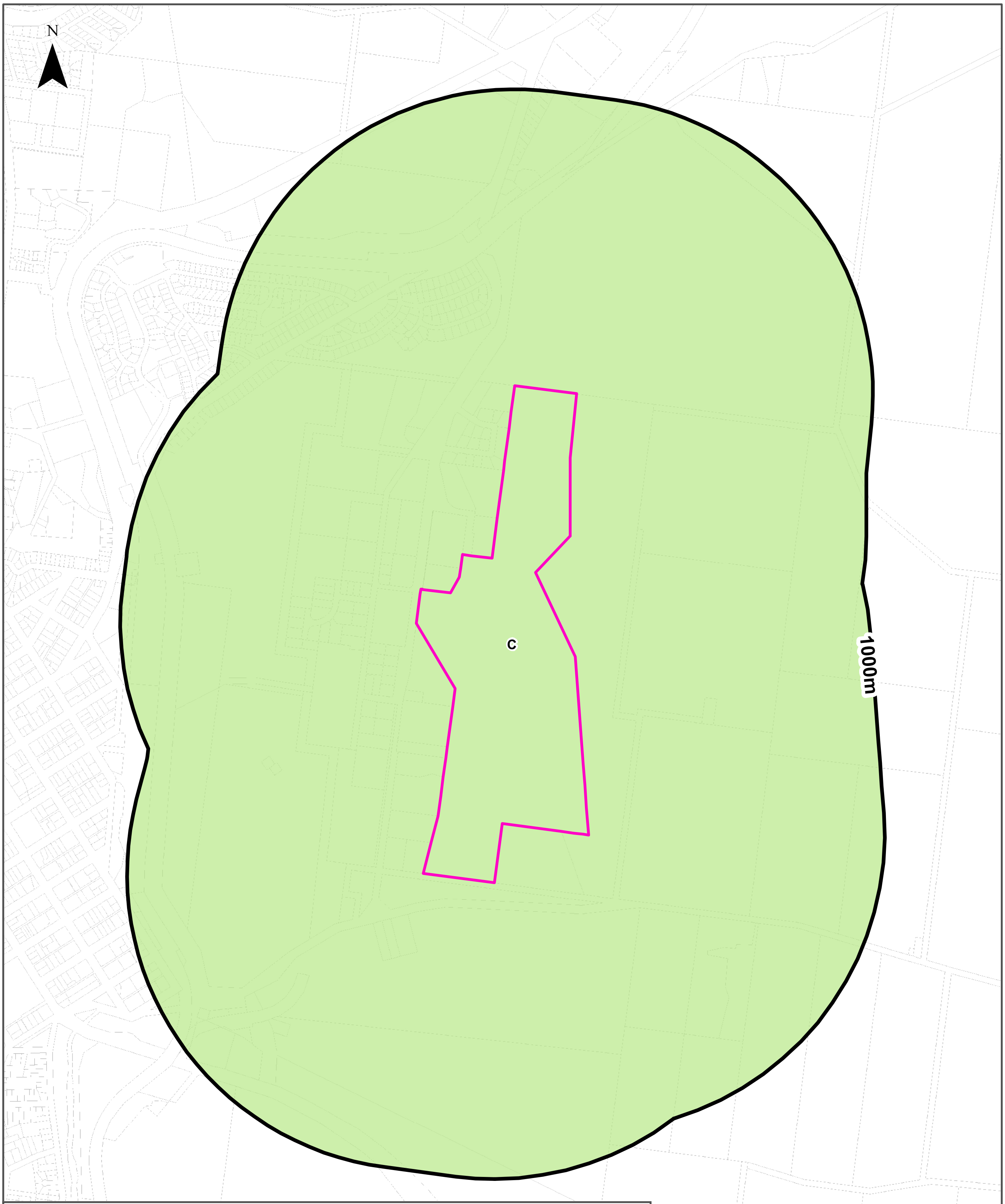
If the on-site Soil Class is 5, what other soil classes exist within 500m?

Soil Class	Description	EPI Name	Distance	Direction
N/A				

Acid Sulfate Data Source Accessed 23/10/2018: NSW Crown Copyright - Planning and Environment

Atlas of Australian Acid Sulfate Soils

Polo Flat Road, Cooma, NSW 2630



Legend

🟪 Site Boundary

⬛ Report Buffer

☐ Property Boundary

Probability of occurrence of Acid Sulfate Soils

🟥 A. High (>70%)

🟨 B. Low (6-70%)

🟩 C. Extremely Low (1-5%)

⬜ D. No Chance (0%)

☐ No Data

Scale:

0 100 200 400 600 800

Meters

Data Sources: Property Boundaries & Topographic Data:
© Department Finance, Services & Innovation 2019

Coordinate System:
GDA 1994 MGA Zone 56

Date: 13March 2019

Acid Sulfate Soils

Polo Flat Road, Cooma, NSW 2630

Atlas of Australian Acid Sulfate Soils

Atlas of Australian Acid Sulfate Soil categories within the dataset buffer:

Class	Description	Distance
C	Extremely low probability of occurrence. 1-5% chance of occurrence with occurrences in small localised areas.	0m

Atlas of Australian Acid Sulfate Soils Data Source: CSIRO

Dryland Salinity

Polo Flat Road, Cooma, NSW 2630

Dryland Salinity - National Assessment

Is there Dryland Salinity - National Assessment data onsite?

No

Is there Dryland Salinity - National Assessment data within the dataset buffer?

No

What Dryland Salinity assessments are given?

Assessment 2000	Assessment 2020	Assessment 2050	Distance	Direction
N/A	N/A	N/A	N/A	N/A

Dryland Salinity Data Source : National Land and Water Resources Audit
The Commonwealth and all suppliers of source data used to derive the maps of "Australia, Forecast Areas Containing Land of High Hazard or Risk of Dryland Salinity from 2000 to 2050" do not warrant the accuracy or completeness of information in this product. Any person using or relying upon such information does so on the basis that the Commonwealth and data suppliers shall bear no responsibility or liability whatsoever for any errors, faults, defects or omissions in the information. Any persons using this information do so at their own risk.
In many cases where a high risk is indicated, less than 100% of the area will have a high hazard or risk.

Dryland Salinity Potential of Western Sydney

Dryland Salinity Potential of Western Sydney within the dataset buffer?

Feature Id	Classification	Description	Distance	Direction
N/A	Outside Data Coverage			

Dryland Salinity Potential of Western Sydney Data Source : NSW Office of Environment and Heritage

Mining Subsidence Districts

Polo Flat Road, Cooma, NSW 2630

Mining Subsidence Districts

Mining Subsidence Districts within the dataset buffer:

District	Distance	Direction
There are no Mining Subsidence Districts within the report buffer		

Mining Subsidence District Data Source: © Land and Property Information (2016)

State Environmental Planning Policy

Polo Flat Road, Cooma, NSW 2630

State Significant Precincts

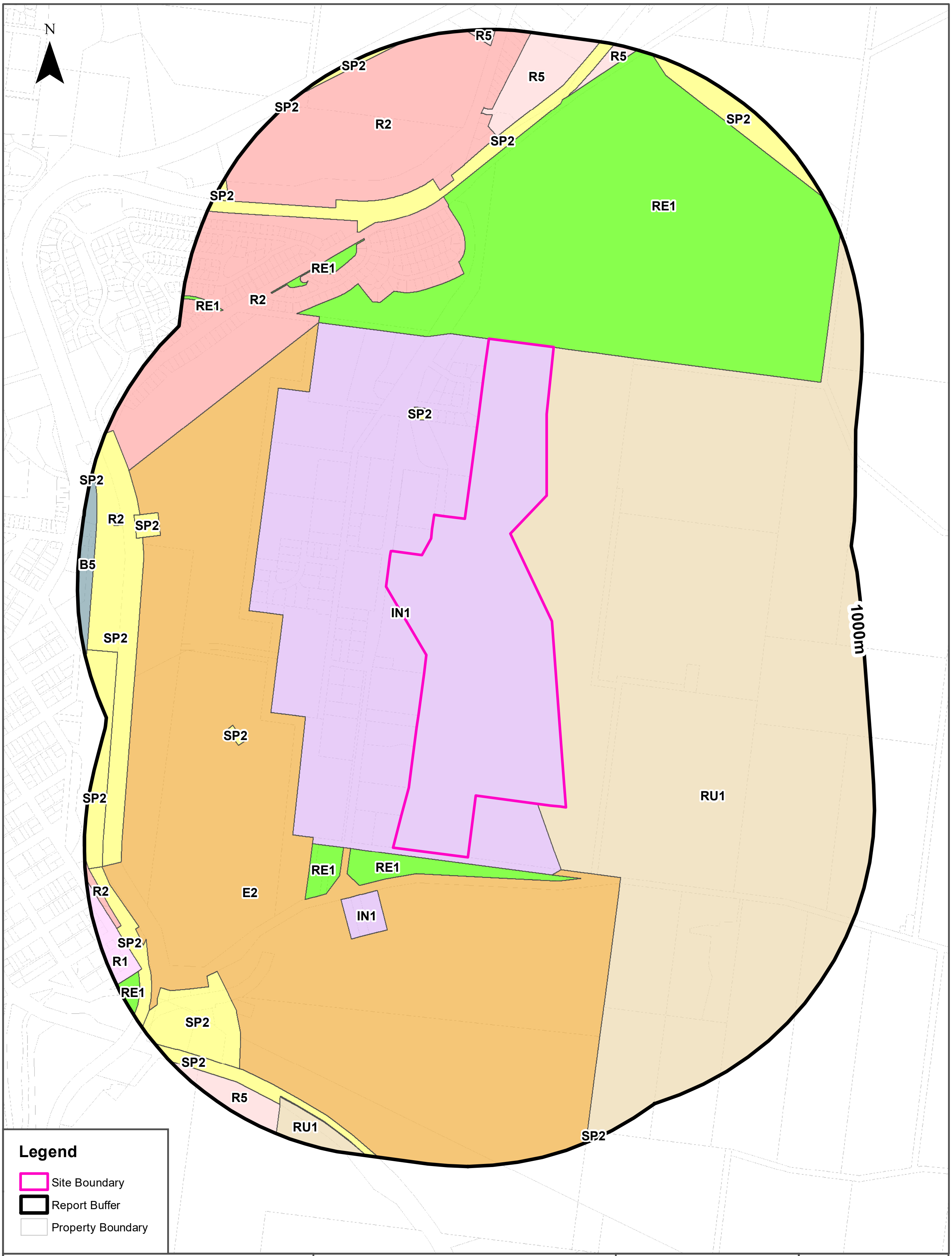
What SEPP State Significant Precincts exist within the dataset buffer?

Map Id	Precinct	EPI Name	Published Date	Commenced Date	Currency Date	Amendment	Distance	Direction
N/A	No Records in Buffer							

State Environment Planning Policy Data Source: NSW Crown Copyright - Planning & Environment

EPI Planning Zones

Polo Flat Road, Cooma, NSW 2630



Scale: 0 100 200 400 600 800 Meters

Data Sources: Property Boundaries & Topographic Data:
© Department Finance, Services & Innovation 2019
Planning: NSW Crown Copyright - Planning & Environment

Coordinate System:
GDA 1994 MGA Zone 56

Date: 13 March 2019

Environmental Planning Instrument

Polo Flat Road, Cooma, NSW 2630

Land Zoning

What EPI Land Zones exist within the dataset buffer?

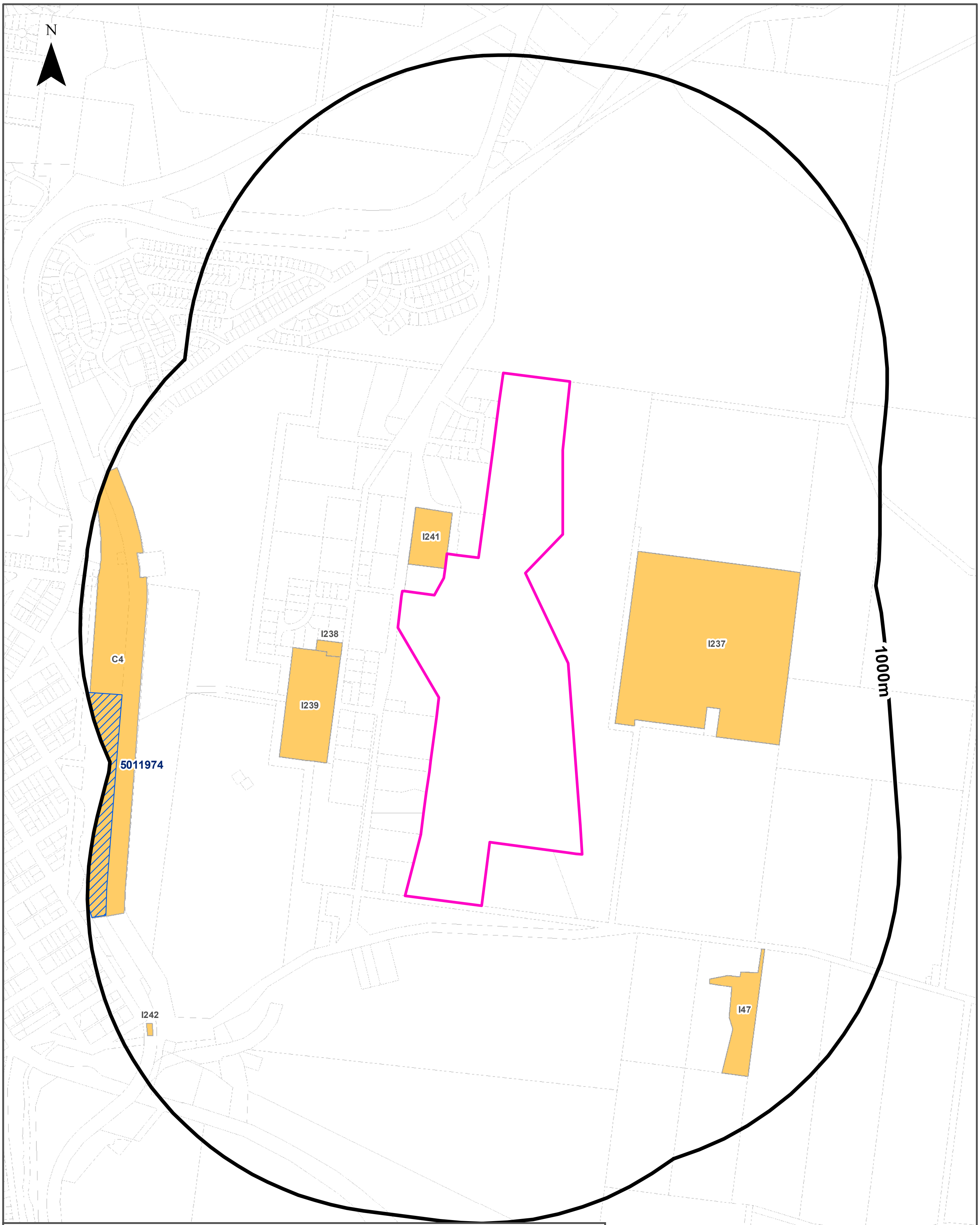
Zone	Description	Purpose	EPI Name	Published Date	Commenced Date	Currency Date	Amendment	Distance	Direction
IN1	General Industrial		Cooma-Monaro Local Environmental Plan 2013	25/10/2013	25/10/2013	15/08/2014		0m	Onsite
RE1	Public Recreation		Cooma-Monaro Local Environmental Plan 2013	25/10/2013	25/10/2013	15/08/2014		0m	North
RU1	Primary Production		Cooma-Monaro Local Environmental Plan 2013	25/10/2013	25/10/2013	15/08/2014		0m	North East
RE1	Public Recreation		Cooma-Monaro Local Environmental Plan 2013	25/10/2013	25/10/2013	15/08/2014		20m	South
E2	Environmental Conservation		Cooma-Monaro Local Environmental Plan 2013	25/10/2013	25/10/2013	15/08/2014		61m	South West
IN1	General Industrial		Cooma-Monaro Local Environmental Plan 2013	25/10/2013	25/10/2013	15/08/2014		147m	South West
RE1	Public Recreation		Cooma-Monaro Local Environmental Plan 2013	25/10/2013	25/10/2013	15/08/2014		161m	South West
SP2	Infrastructure	Water Pumping Station	Cooma-Monaro Local Environmental Plan 2013	25/10/2013	25/10/2013	15/08/2014		162m	North
R2	Low Density Residential		Cooma-Monaro Local Environmental Plan 2013	25/10/2013	25/10/2013	15/08/2014		223m	North West
SP2	Infrastructure	Rail Infrastructure Facilities	Cooma-Monaro Local Environmental Plan 2013	25/10/2013	25/10/2013	15/08/2014		470m	North
R2	Low Density Residential		Cooma-Monaro Local Environmental Plan 2013	25/10/2013	25/10/2013	15/08/2014		505m	North
RE1	Public Recreation		Cooma-Monaro Local Environmental Plan 2013	25/10/2013	25/10/2013	15/08/2014		510m	North West
SP2	Infrastructure	Telecommunications	Cooma-Monaro Local Environmental Plan 2013	25/10/2013	25/10/2013	15/08/2014		542m	South West
R5	Large Lot Residential		Cooma-Monaro Local Environmental Plan 2013	25/10/2013	25/10/2013	15/08/2014		655m	North
SP2	Infrastructure	Stock & Sale Yards	Cooma-Monaro Local Environmental Plan 2013	25/10/2013	25/10/2013	15/08/2014		696m	South West
SP2	Infrastructure	Telecommunications	Cooma-Monaro Local Environmental Plan 2013	25/10/2013	25/10/2013	15/08/2014		745m	West
R5	Large Lot Residential		Cooma-Monaro Local Environmental Plan 2013	25/10/2013	25/10/2013	15/08/2014		812m	North East
SP2	Infrastructure	Rail Infrastructure Facilities	Cooma-Monaro Local Environmental Plan 2013	25/10/2013	25/10/2013	15/08/2014		853m	South West
SP2	Infrastructure	Classified Road	Cooma-Monaro Local Environmental Plan 2013	25/10/2013	25/10/2013	15/08/2014		860m	South
RE1	Public Recreation		Cooma-Monaro Local Environmental Plan 2013	25/10/2013	25/10/2013	15/08/2014		865m	North West
R2	Low Density Residential		Cooma-Monaro Local Environmental Plan 2013	25/10/2013	25/10/2013	15/08/2014		871m	West
RU1	Primary Production		Snowy River Local Environmental Plan 2013	13/12/2013	13/12/2013	20/07/2018		885m	South West
SP2	Infrastructure	Rail Infrastructure Facilities	Cooma-Monaro Local Environmental Plan 2013	25/10/2013	25/10/2013	15/08/2014		894m	West
R1	General Residential		Cooma-Monaro Local Environmental Plan 2013	25/10/2013	25/10/2013	15/08/2014		903m	South West
R5	Large Lot Residential		Cooma-Monaro Local Environmental Plan 2013	25/10/2013	25/10/2013	15/08/2014		906m	South West
R2	Low Density Residential		Cooma-Monaro Local Environmental Plan 2013	25/10/2013	25/10/2013	15/08/2014		916m	South West

Zone	Description	Purpose	EPI Name	Published Date	Commenced Date	Currency Date	Amendment	Distance	Direction
RE1	Public Recreation		Cooma-Monaro Local Environmental Plan 2013	25/10/2013	25/10/2013	15/08/2014		918m	South West
SP2	Infrastructure	Cemetery and Crematorium	Cooma-Monaro Local Environmental Plan 2013	25/10/2013	25/10/2013	15/08/2014		918m	North East
B5	Business Development		Cooma-Monaro Local Environmental Plan 2013	25/10/2013	25/10/2013	15/08/2014		950m	West
SP2	Infrastructure	Electricity Substation	Cooma-Monaro Local Environmental Plan 2013	25/10/2013	25/10/2013	15/08/2014		952m	North West
SP2	Infrastructure	Waste and Resource Management Facility	Cooma-Monaro Local Environmental Plan 2013	25/10/2013	25/10/2013	15/08/2014		965m	South East
SP2	Infrastructure	Classified Road	Cooma-Monaro Local Environmental Plan 2013	25/10/2013	25/10/2013	15/08/2014		982m	West

Environmental Planning Instrument Data Source: NSW Crown Copyright - Planning & Environment

Heritage Items

Polo Flat Road, Cooma, NSW 2630



Legend

□ Site Boundary
▤ Commonwealth Heritage List
▨ State Heritage Items
□ Property Boundary
□ Report Buffer
▨ National Heritage List
■ EPI Heritage Items

Scale:

0 100 200 400 600 800
Meters

Data Sources: Property Boundaries & Topographic Data:
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Heritage - NSW Crown Copyright - Planning & Environment

Coordinate System:
GDA 1994 MGA Zone 56

Date: 13 March 2019

Heritage

Polo Flat Road, Cooma, NSW 2630

Commonwealth Heritage List

What are the Commonwealth Heritage List Items located within the dataset buffer?

Place Id	Name	Address	Place File No	Class	Status	Register Date	Distance	Direction
N/A	No records in buffer							

Heritage Data Source: Australian Government Department of the Environment and Energy - Heritage Branch

National Heritage List

What are the National Heritage List Items located within the dataset buffer?
Note. Please click on Place Id to activate a hyperlink to online website.

Place Id	Name	Address	Place File No	Class	Status	Register Date	Distance	Direction
N/A	No records in buffer							

Heritage Data Source: Australian Government Department of the Environment and Energy - Heritage Branch

State Heritage Register - Curtilages

What are the State Heritage Register Items located within the dataset buffer?

Map Id	Name	Address	LGA	Listing Date	Listing No	Plan No	Distance	Direction
5011974	Cooma Railway Station and yard group	Bradley Street, Cooma	Cooma-Monaro	02/04/1999	01116	2532	894m	West

Heritage Data Source: NSW Crown Copyright - Office of Environment & Heritage

Environmental Planning Instrument - Heritage

What are the EPI Heritage Items located within the dataset buffer?

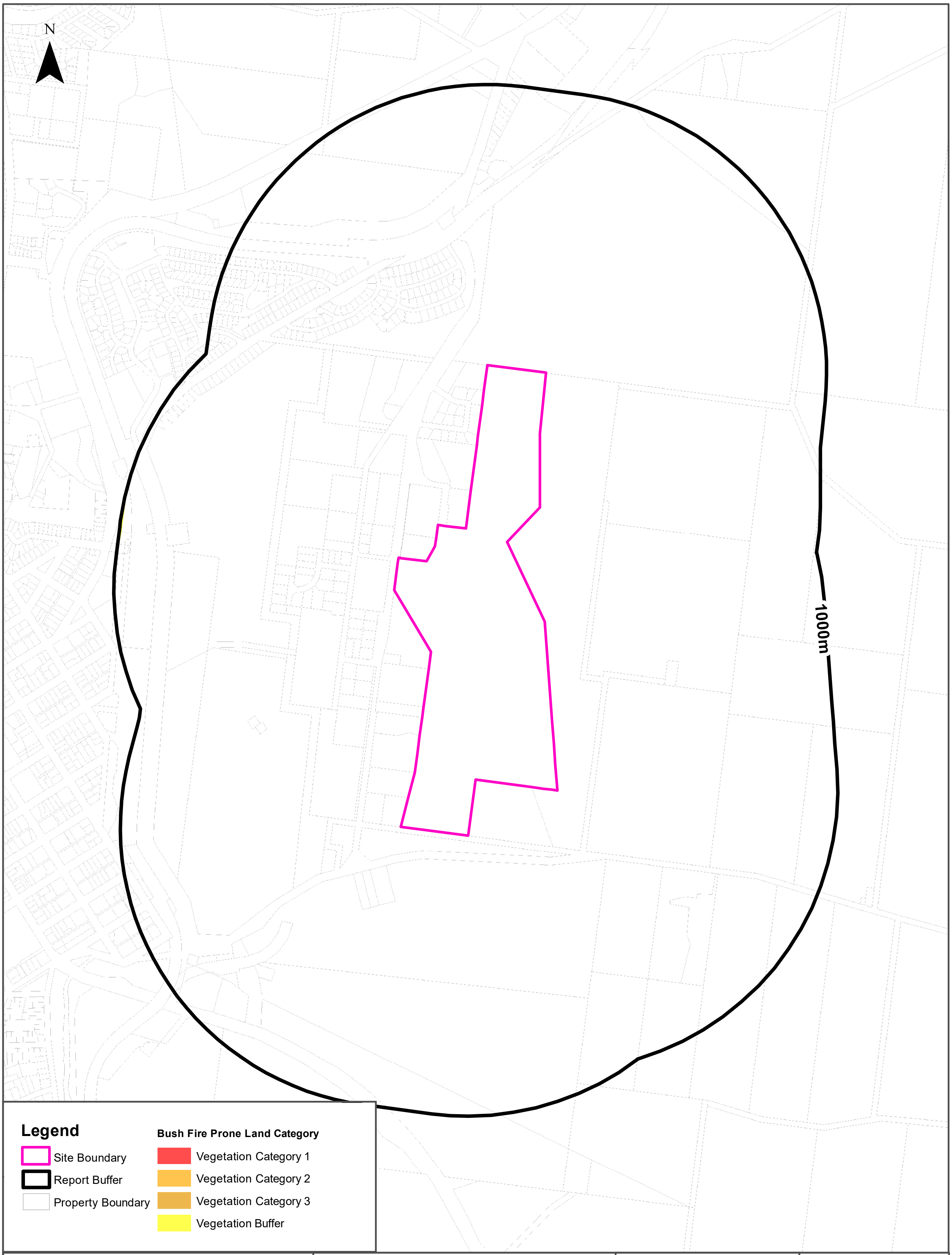
Map Id	Name	Classification	Significance	EPI Name	Published Date	Commenced Date	Currency Date	Distance	Direction
I241	Woolshed	Item - General	Local	Cooma-Monaro Local Environmental Plan 2013	25/10/2013	25/10/2013	25/10/2013	0m	North West
I237	Mine - Bushy Hill	Item - General	Local	Cooma-Monaro Local Environmental Plan 2013	25/10/2013	25/10/2013	25/10/2013	134m	East
I238	Nissen Hut	Item - General	Local	Cooma-Monaro Local Environmental Plan 2013	25/10/2013	25/10/2013	25/10/2013	180m	West

Map Id	Name	Classification	Significance	EPI Name	Published Date	Commenced Date	Currency Date	Distance	Direction
I239	Nissen Huts	Item - General	Local	Cooma-Monaro Local Environmental Plan 2013	25/10/2013	25/10/2013	25/10/2013	201m	West
I47	Homestead - The Willows	Item - General	Local	Cooma-Monaro Local Environmental Plan 2013	25/10/2013	25/10/2013	25/10/2013	561m	South East
C4	Cooma Railway Precinct	Conservation Area - General	State	Cooma-Monaro Local Environmental Plan 2013	25/10/2013	25/10/2013	25/10/2013	793m	West
I242	Railway bridge	Item - General	State	Cooma-Monaro Local Environmental Plan 2013	25/10/2013	25/10/2013	25/10/2013	891m	South West

Heritage Data Source: NSW Crown Copyright - Planning & Environment

Natural Hazards - Bush Fire Prone Land

Polo Flat Road, Cooma, NSW 2630



Scale:

Data Sources: Bush Fire Prone Land: © NSW Rural Fire Service 2019. Property Boundaries: © Department Finance, Services & Innovation 2019

Coordinate System:
GDA 1994 MGA Zone 56

Date: 13 March 2019

Natural Hazards

Polo Flat Road, Cooma, NSW 2630

Bush Fire Prone Land

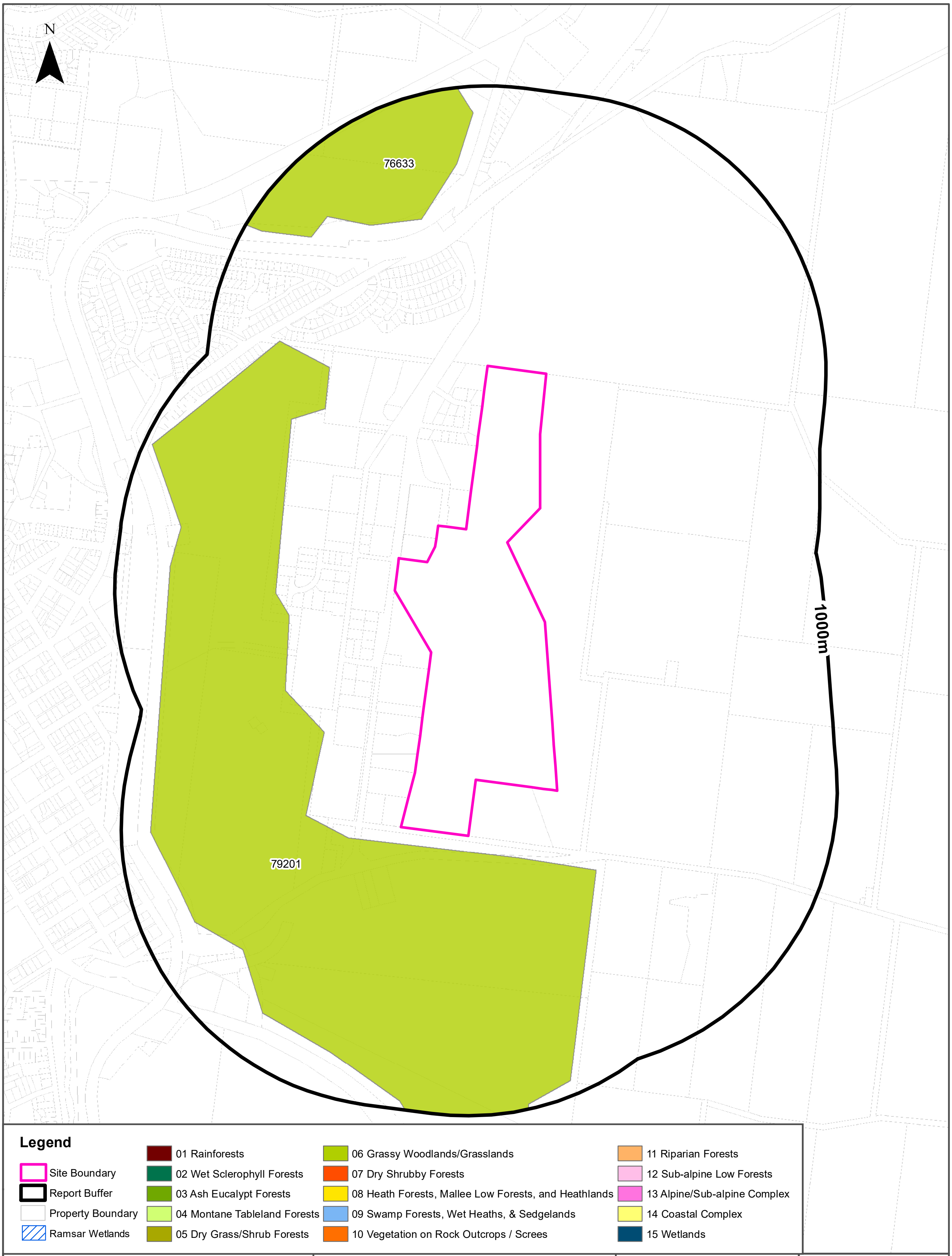
What are the nearest Bush Fire Prone Land Categories that exist within the dataset buffer?

Bush Fire Prone Land Category	Distance	Direction
Vegetation Buffer	990m	West

NSW Bush Fire Prone Land - © NSW Rural Fire Service under Creative Commons 4.0 International Licence

Ecological Constraints - Vegetation of the Southern Forests

Polo Flat Road, Cooma, NSW 2630



Scale:

0 100 200 400 600 800
Meters

Data Sources: Property Boundaries & Topographic Data:
© Department Finance, Services & Innovation 2019

Coordinate System:
GDA 1994 MGA Zone 56

Date: 13 March 2019

Ecological Constraints

Polo Flat Road, Cooma, NSW 2630

Vegetation of the Southern Forests

What vegetation of the Southern Forests exists within the dataset buffer?

Map Id	Veg Code	Formation	Class	Group	Distance	Direction
79201	157	06 Grassy Woodlands/Grasslands	06d ST Temperate Grasslands	ACT-Monaro Dry Grassland - Bothriochloa macra	56m	South West
76633	157	06 Grassy Woodlands/Grasslands	06d ST Temperate Grasslands	ACT-Monaro Dry Grassland - Bothriochloa macra	574m	North

Vegetation of the Southern Forests: NSW Office of Environment and Heritage

Ramsar Wetlands

What Ramsar Wetland areas exist within the dataset buffer?

Map Id	Ramsar Name	Wetland Name	Designation Date	Source	Distance	Direction
N/A	No records in buffer					

Ramsar Wetlands Data Source: © Commonwealth of Australia - Department of Environment

Ecological Constraints

Polo Flat Road, Cooma, NSW 2630

Groundwater Dependent Ecosystems Atlas

Type	GDE Potential	Geomorphology	Ecosystem Type	Aquifer Geology	Distance
N/A	No records within buffer				

Groundwater Dependent Ecosystems Atlas Data Source: The Bureau of Meteorology

Ecological Constraints

Polo Flat Road, Cooma, NSW 2630

Inflow Dependent Ecosystems Likelihood

Type	IDE Likelihood	Geomorphology	Ecosystem Type	Aquifer Geology	Distance
N/A	No records within buffer				

Inflow Dependent Ecosystems Likelihood Data Source: The Bureau of Meteorology

Ecological Constraints

Polo Flat Road, Cooma, NSW 2630

NSW BioNet Atlas

Species on the NSW BioNet Atlas that have a NSW or federal conservation status, a NSW sensitivity status, or are listed under a migratory species agreement, and are within 10km of the site?

Kingdom	Class	Scientific	Common	NSW Conservation Status	NSW Sensitivity Class	Federal Conservation Status	Migratory Species Agreements
Animalia	Amphibia	Litoria aurea	Green and Golden Bell Frog	Endangered	Not Sensitive	Vulnerable	
Animalia	Aves	Ardea ibis	Cattle Egret	Not Listed	Not Sensitive	Not Listed	CAMBA;JAMBA
Animalia	Aves	Artamus cyanopterus cyanopterus	Dusky Woodswallow	Vulnerable	Not Sensitive	Not Listed	
Animalia	Aves	Callocephalon fimbriatum	Gang-gang Cockatoo	Vulnerable	Category 3	Not Listed	
Animalia	Aves	Chthonicola sagittata	Speckled Warbler	Vulnerable	Not Sensitive	Not Listed	
Animalia	Aves	Circus assimilis	Spotted Harrier	Vulnerable	Not Sensitive	Not Listed	
Animalia	Aves	Climacteris picumnus victoriae	Brown Treecreeper (eastern subspecies)	Vulnerable	Not Sensitive	Not Listed	
Animalia	Aves	Haliaeetus leucogaster	White-bellied Sea-Eagle	Vulnerable	Not Sensitive	Not Listed	CAMBA
Animalia	Aves	Hieraaetus morphnoides	Little Eagle	Vulnerable	Not Sensitive	Not Listed	
Animalia	Aves	Hirundapus caudacutus	White-throated Needletail	Not Listed	Not Sensitive	Not Listed	ROKAMBA;CAMBA;JAMBA
Animalia	Aves	Lophoictinia isura	Square-tailed Kite	Vulnerable	Category 3	Not Listed	
Animalia	Aves	Melanodryas cucullata cucullata	Hooded Robin (south-eastern form)	Vulnerable	Not Sensitive	Not Listed	
Animalia	Aves	Petroica boodang	Scarlet Robin	Vulnerable	Not Sensitive	Not Listed	
Animalia	Aves	Petroica phoenicea	Flame Robin	Vulnerable	Not Sensitive	Not Listed	
Animalia	Aves	Stagonopleura guttata	Diamond Firetail	Vulnerable	Not Sensitive	Not Listed	
Animalia	Mammalia	Petaurus norfolcensis	Squirrel Glider	Vulnerable	Not Sensitive	Not Listed	
Animalia	Mammalia	Phascolarctos cinereus	Koala	Vulnerable	Not Sensitive	Vulnerable	
Animalia	Mammalia	Pteropus poliocephalus	Grey-headed Flying-fox	Vulnerable	Not Sensitive	Vulnerable	
Animalia	Reptilia	Aprasia parapulchella	Pink-tailed Legless Lizard	Vulnerable	Not Sensitive	Vulnerable	
Animalia	Reptilia	Delma impar	Striped Legless Lizard	Vulnerable	Not Sensitive	Vulnerable	
Animalia	Reptilia	Suta flagellum	Little Whip Snake	Vulnerable	Not Sensitive	Not Listed	
Animalia	Reptilia	Tympanocryptis pinguicolla	Grassland Earless Dragon	Endangered	Not Sensitive	Endangered	
Animalia	Reptilia	Varanus rosenbergi	Rosenberg's Goanna	Vulnerable	Not Sensitive	Not Listed	
Plantae	Flora	Calotis glandulosa	Mauve Burr-daisy	Vulnerable	Not Sensitive	Vulnerable	
Plantae	Flora	Dodonaea procumbens	Creeping Hop-bush	Vulnerable	Not Sensitive	Vulnerable	
Plantae	Flora	Eucalyptus aggregata	Black Gum	Vulnerable	Not Sensitive	Vulnerable	

Kingdom	Class	Scientific	Common	NSW Conservation Status	NSW Sensitivity Class	Federal Conservation Status	Migratory Species Agreements
Plantae	Flora	Lepidium hyssopifolium	Aromatic Peppercress	Endangered	Not Sensitive	Endangered	
Plantae	Flora	Leucochrysum albicans var. tricolor	Hoary Sunray	Not Listed	Not Sensitive	Endangered	
Plantae	Flora	Rutidosis leiolepis	Monaro Golden Daisy	Vulnerable	Not Sensitive	Vulnerable	
Plantae	Flora	Swainsona sericea	Silky Swainson-pea	Vulnerable	Not Sensitive	Not Listed	

Data does not include NSW category 1 sensitive species.
NSW BioNet: © State of NSW and Office of Environment and Heritage
Data obtained 13/03/2019

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Annexure B

Groundwater drilling and completion report

Drilling and completion report

Stage 6 - Polo Flat drilling

Prepared for Snowy Hydro Limited
August 2019

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Drilling and completion report

Stage 6 - Polo Flat drilling

Report Number

J17188 RP69 – Contamination assessment report – Annexure B

Client

Snowy Hydro Limited

Date

16 August 2019

Version

v01 Final

Prepared by	**Approved by**
Claire Corthier	**James Duggleby**
Hydrogeologist	Principal Hydrogeologist
16 August 2019	16 August 2019

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Tables

Figures

1 Introduction

1.1 Project overview

Snowy Hydro Limited (SHL), the owner and operator of the Snowy Mountains Hydroelectric Scheme located in south-east Australia, is expanding the existing scheme by developing the Snowy 2.0 Project. The expanded facility will be constructed between Tantangara and Talbingo Reservoirs in Kosciuszko National Park (KNP).

Polo Flat airstrip near Cooma has been purchased by SHL to develop a concrete batching plant (CBP) as part of Snowy 2.0 Main Works. The CBP will manufacture the precast concrete segmental panels for tunnel construction.

The Stage 6 groundwater monitoring bore drilling program is an investigation into groundwater in the surficial alluvium and competent fractured basalt at Polo Flat. This investigation is in support of the contamination assessment to be included within the Environmental Impact Statement (EIS) for Polo Flat.

Highland Drilling was engaged by EMM Consulting Pty Limited (EMM) to complete the drilling and installation of the monitoring bores at Polo Flat. EMM provided the design and specifications for the bores, supervision of the drilling and installations, and testing and sampling of the completed bores.

1.2 Program objectives

The Polo Flat monitoring bores were designed to:

- identify and characterise groundwater within the shallow alluvium and underlying competent fractured basalt in the project area, with particular focus on characterising groundwater flow and quality;
- provide data to inform a contamination assessment of the groundwater;
- establish baseline groundwater conditions for both groundwater level and water quality prior to commencement of works at Polo Flat;
- provide spatial representation of groundwater level and flow directions across the project area to understand the potential contamination sources and the potential impact of the project on surrounding groundwater dependant systems;
- investigate the potential for surface water–groundwater interaction; and
- assess the interaction and potential contamination between shallow and deep groundwater systems.

2 Site characterisation

2.1 Site location and description

Table 2.1 summarises the site location.

Table 2.1 Site identification

Descriptor	Site details
Location	63 Polo Flat Rd, Polo Flat, NSW 2630
Lot and DP number	Lot 14 in DP 250029 and Lot 3 in DP 238762
Local council	Snowy Monaro Regional Council
Parish	Cooma
County	Beresford
Site owner	Snowy Hydro Limited
Site occupier	Snowy Hydro Limited
Current zoning	General Industrial
Past land use	Industrial, airfield
Site area	31.6 ha

Note: ha = hectare

The site lies on a gradual north-west facing slope. The site intersects minor ephemeral water courses that were dry during the site investigations and drilling but could concentrate runoff water during high rainfall events.

There are no water bodies on site. There are, however, several constructed farm dams on the adjoining abattoir to the east of the site.

2.2 Geological setting

The *Bega - Mallacoota 1:250,000 geological sheet* (Lewis and Glen 1995) outlines surface geological units found within the project area. The surficial geology is mapped as Quaternary alluvium with small areas of Tertiary basalt on the western and southern edges.

The geological units within the site are described in Table 2.2.

Table 2.2 Geological units within the site

Symbol	Group	Unit name	Description
Qa	Quaternary	undifferentiated	Alluvial and colluvial deposits: unconsolidated clay, silt, sand and gravel
Tv	Tertiary volcanics	Monaro Volcanics and Bondo Dolerite Member	Basalt, olivine basalt
Srca, Srcb	Bredbo Group (Silurian)	Colinton Volcanics	Sheared, medium-grained crystal-rich dacitic volcanics (dacite, andesite, rhyolite, tuff, limestone)

2.3 Hydrogeological setting

Based on the results of the Environmental Risk and Planning Report (Lotsearch 2019) conducted at the site, the hydrogeology within the site is described as fractured or fissured extensive aquifers of low to moderate productivity. Groundwater flow is expected to be towards the north-west, governed by topography.

Based on the results of a search of the NSW Department of Primary Industries groundwater bores database focused on bores located within the site and within a 1,000 m radius, the depth to water table ranges from 3 to 12 metres below ground level (m bgl).

3 Drilling program

3.1 Overview

Drilling services were provided by Highland Drilling. The drilling and construction of the monitoring borefield took place between 27 and 31 May 2019 using a truck mounted drill rig.

In total seven boreholes were drilled at a diameter of 4”1/2 (114 mm), including:

- five single monitoring bores (PF_MB01, PF_MB02, PF_MB03, PF_MB05 and PF_MB06); and
- one nested monitoring bore site (PF_MB04A and PF_MB04B).

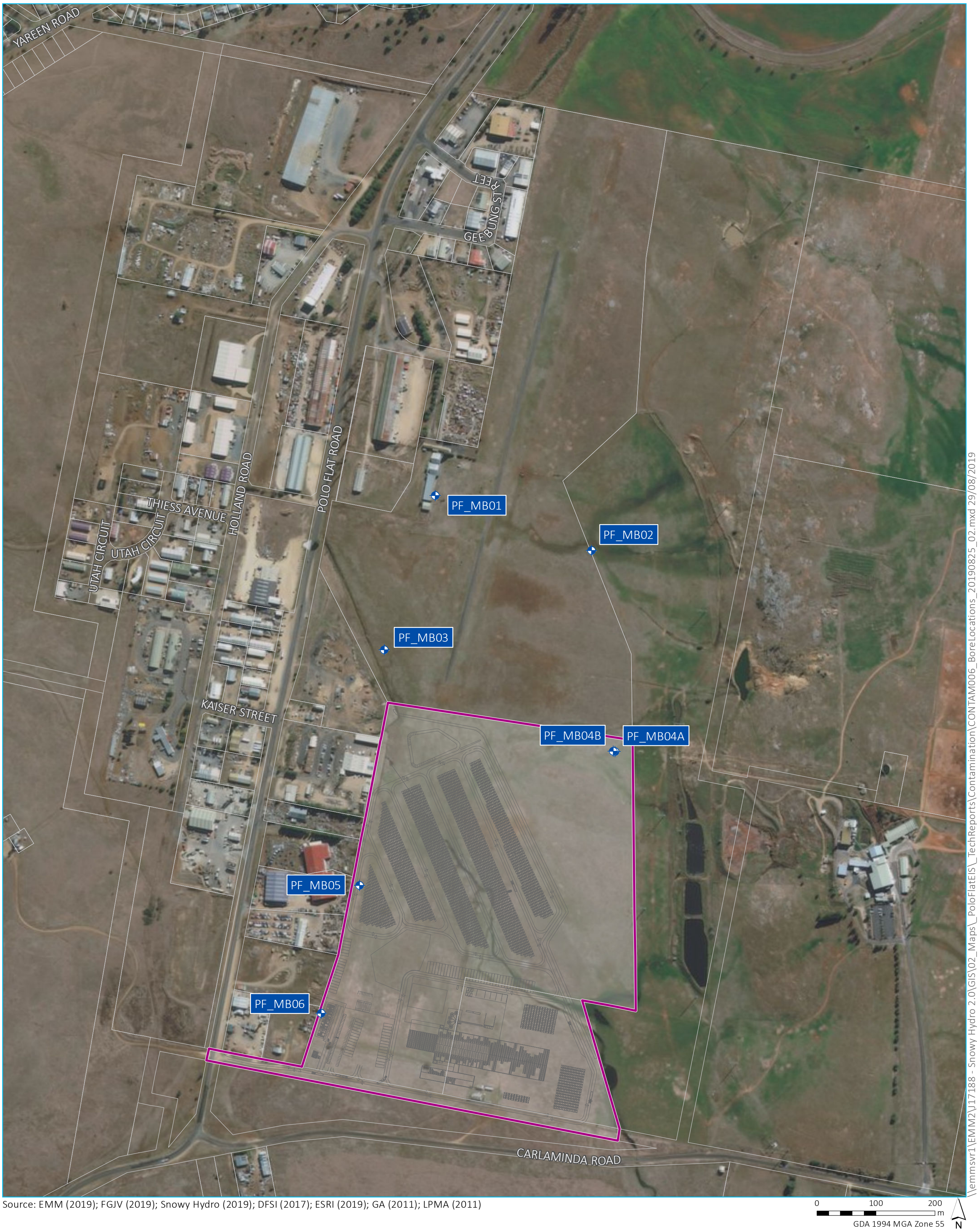
The general bore information is provided in Table 3.1.

Table 3.1 General bore information

Bore ID	**MGA coordinates^1**		**Ground Elevation^2**	**Drilled depth**	**Screened interval**	**Screened formation**	**Screened lithology**
-	**mE**	**mN**	**m AHD**	**m bgl**	**m bgl**	**-**	**-**
PF_MB01	693,090	5,988,456	820.0	13	5–11	Tertiary Basalt	Fractured basalt
PF_MB02	693,354	5,988,363	823.8	19	12–18	Tertiary Basalt	Slightly fractured, fresh basalt
PF_MB03	693,004	5,988,195	821.0	11	3.5–9.5	Tertiary Basalt	Fractured/fissured basalt
PF_MB04A	693,394	5,988,023	825.4	13.5	6.5–12.5	Quaternary Alluvium	Unconsolidated sandy silt and clay
PF_MB04B	693,391	5,988,024	825.3	30	23–29	Tertiary Alluvium	Weakly consolidated silty clay
PF_MB05	692,962	5,987,797	821.0	12.5	511	Tertiary Basalt	Fractured/fissured basalt
PF_MB06	692,897	5,987,581	822.3	18	11–17	Tertiary Basalt	Slightly weathered to fresh basalt

Notes: 1. coordinate system Zone 55 GDA 94
2. Drone surveyed
m AHD: metres Australian Height Datum
m bgl: metres below ground level

Figure 3.1 presents the monitoring bore locations.



\\emmsvr1\EMM2\J17188 - Snowy Hydro 2.0\GIS\02_Maps_PoloFlatEIS_TechReports\Contamination\CONTAM006_BoreLocations_20190825_02.mxd 29/08/2019

Source: EMM (2019); FGJV (2019); Snowy Hydro (2019); DFSI (2017); ESRI (2019); GA (2011); LPMA (2011)

KEY

▭ Site boundary	⯐ Monitoring bore*
▭ Cadastral boundary	— Indicative site layout

Location of bores

Snowy 2.0
Contamination Assessment
Proposed Segment Factory
Figure 3.1

*MB04A (shallow) and MB04B (deep) are nested monitoring bores

3.2 Drilling and construction specifications

The monitoring bores were drilled and constructed in accordance with the Minimum Construction Requirements for Water Bores in Australia (NUDLC 2012). Drilling and construction stages were minimal impact and temporary activities.

Most monitoring boreholes at Polo Flat were drilled using a rotary percussion technique using air (also known as air hammer) to evacuate cuttings from the borehole during drilling. The nested bores MB04A and MB04B were drilled using both blade and air hammer techniques. These methods allow information on water strikes, quality and yields to be collected while drilling.

All water and cuttings produced from the bores during drilling were stored in an above ground tank and evacuated by South East Waste Recovery for classification and appropriate disposal at a licensed waste facility.

The bores were drilled at a 4”1/2 (114 mm) diameter and constructed with Class 18 50 mm internal diameter PVC-U blank casing and 0.5 mm aperture PVC-U screens. A 1 to 2 m sump and end cap were placed at the base of the casing. A washed and graded (3–5 mm) gravel filter pack was installed in the annulus around the screen and extended a minimum of two metres above the screened section. A slow release bentonite pellet seal was installed above the gravel pack and the annulus was then backfilled with blue metal gravel to approximately 2 m bgl. The bentonite seal ensures no vertical connection between groundwater systems above the screened section. The annulus was completed with a cement grout to surface.

Concrete slabs (0.5 m x 0.5 m) were constructed around the bores and high visibility lockable steel monuments were installed to cover the bores.

The indicative bore construction is shown in Figure 3.2.

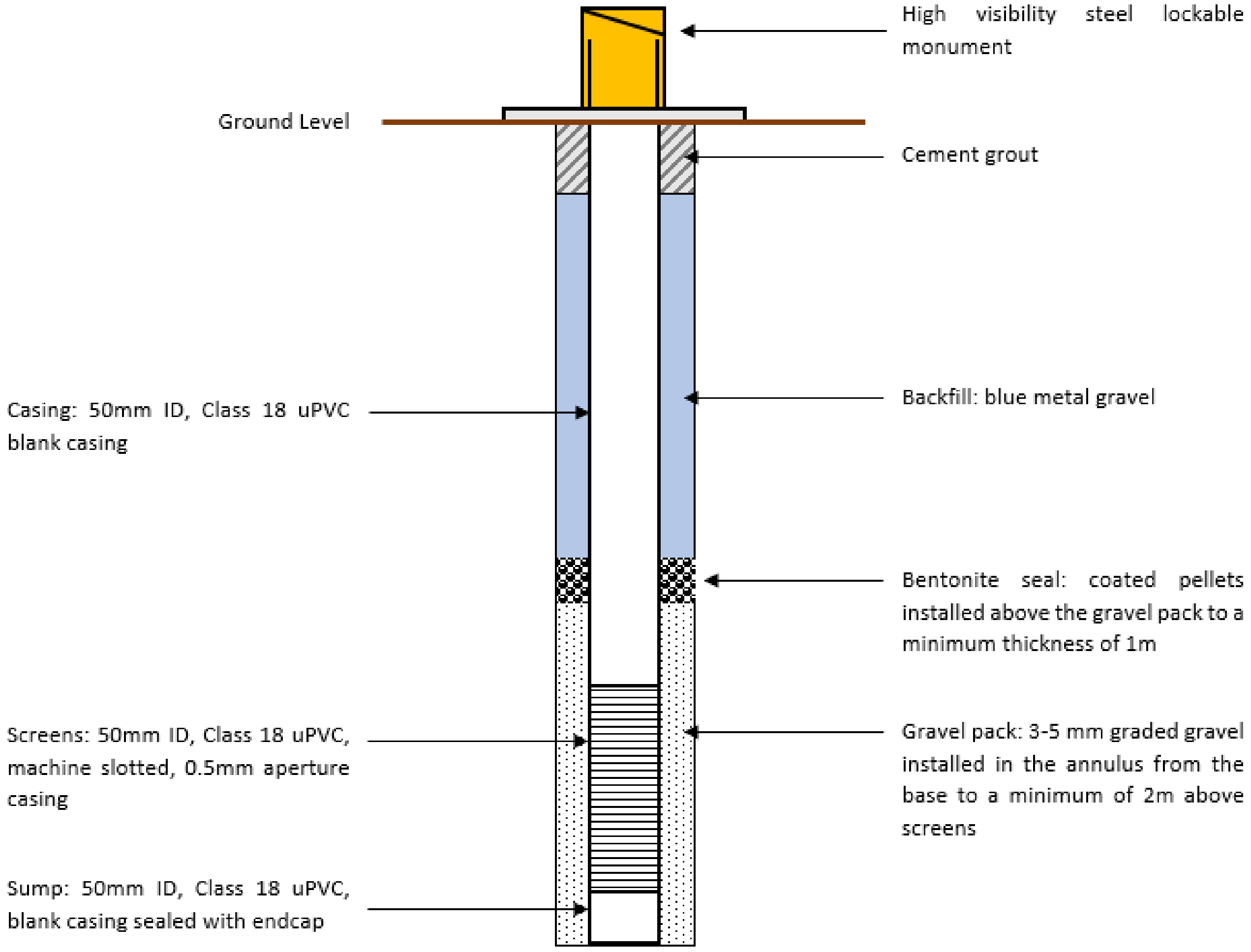


Figure 3.2 Bore construction diagram

Following installation, the groundwater monitoring bores were developed by airlifting until the purged water was free of sediment and the physico-chemical water quality parameters had stabilised indicating groundwater representative of aquifer conditions.

3.3 Drilling observations

3.3.1 Geology

Geology was logged while drilling at one-metre intervals. The dominant geology encountered at each location during drilling can be subdivided into:

- residual soil/fill – dark brown, unconsolidated clay;
- Quaternary alluvium – yellowish orange, unconsolidated slightly sandy silt and clay, locally oxidised;
- Tertiary basalt - dark bluish grey to grey, fine-grained, fresh to highly weathered, locally oxidised, moderately fractured with quartz veins; and
- Tertiary alluvium – light bluish grey, weakly consolidated silty clay.

The geology of the site is interpreted to be mostly Tertiary basalt. Five of the seven bores intercepted the Tertiary basalt bores from the surface to their total depths.

An alluvial channel overlies the Tertiary basalt along the eastern boundary of the site. Two bores comprising a nested bore system were drilled within the alluvium. The shallow bore was screened within Quaternary alluvium. It is interpreted that the deep bore of the nested system intercepts alluvial deposits from the Tertiary period from about 22 m bgl. The limit between the Quaternary and Tertiary alluvia is characterised by a sharp change in colour (yellowish orange to light bluish grey) and lithification and a finer grains size.

Detailed bore logs showing the encountered geology are shown in Attachment B.

3.3.2 Groundwater

Groundwater yields (where inflow was encountered) and water quality physico-chemical parameters were recorded while drilling (Table 3.2 and Table 3.3).

Table 3.2 Groundwater inflow while drilling

Bore ID	First water cut (m bgl)	Flow rate at TD (L/s)	Final airlift yield (L/s)
MB01	9	0.2	0.20
MB02	15	0.1	0.05
MB03	6	0.1	0.25
MB04A	10	<0.1	<0.01[1]
MB04B	None	0.0	<0.01[1]
MB05	10	0.1	0.24

Notes: 1. airlifted until dry
L/s = litres per second
m bgl: metres below ground level
TD: Total Depth

Table 3.3 Groundwater quality at Total Depth (TD)

Parameter	MB01	MB02	MB03	MB04A	MB04B	MB05	MB06
Temperature (^{0}C)	13.1	9.8	21.0	-[1]	-[1]	12.2	15.9
pH	8.0	9.6	8.6	-[1]	-[1]	8.2	7.8
Electrical conductivity (µS/cm)	1056	318	649	-[1]	-[1]	688	424

Notes: 1. Insufficient groundwater inflow to sample
^{0}C = degrees Celsius
µS/cm = microsiemens per centimetre

4 Groundwater levels

Standing water levels (SWL) were measured post-development (on 31 May 2019) and one week later on 6 June 2019 (Table 4.1).

Table 4.1 Groundwater levels

Bore ID	31 May 2019		6 June 2019	
	SWL (m bgl)	SWL (m AHD)	SWL (m bgl)	SWL (m AHD)
PF_MB01	6.0	814.0	6.1	814.0
PF_MB02	9.9	813.9	9.8	814.0
PF_MB03	4.9	814.0	5.0	813.9
PF_MB04A	7.2	818.2	6.6	818.8
PF_MB04B	21.6	803.7	8.7	816.6
PF_MB05	6.3	814.7	6.7	814.3
PF_MB06	8.1	814.1	8.2	814.0

Note: SWL = Standing Water Level
m bgl = metres below ground level
m AHD = metres Australian Height Datum

The discrepancy between the standing water levels measured at MB04B is attributed to the very low permeability of the screened aquitard and suggests the bore was still recovering from its development when the first reading was recorded. The second reading is therefore considered more representative and was used for groundwater contouring.

Interpreted groundwater contours using data from 6 June 2019 are presented in Figure 4.1.

Source: EMM (2019); FGJV (2019); Snowy Hydro (2019); DFSI (2017); ESRI (2019); GA (2011); LPMA (2011)

KEY

▭	The site
—	Indicative site layout
▭	Cadastral boundary
◈	Monitoring bore*
·····	Inferred groundwater contour (m)

*MB04A (shallow) and MB04B (deep) are nested monitoring bores

Groundwater simplified contours

Snowy 2.0
Contamination Assessment
Proposed Segment Factory
Figure 4.1

5 Hydraulic conductivity

5.1 Field testing methodology

Falling and rising head (‘slug’) tests were conducted to estimate the horizontal hydraulic conductivity of the screened water bearing zone.

A falling head test is achieved by introducing a ‘slug’ device to displace the water column within the monitoring bore causing the water level to instantaneously rise and water to flow from the bore into the aquifer via the bore screen (Butler 1998). The water level decay is recorded until the water level has returned or is close to static level.

A rising head test is then conducted where the slug is removed causing a reduction in the bore water level with respect to the screened formation. Water then moves from the formation into the bore via the bore screen. The water level recovery is recorded until the water level has returned to static level.

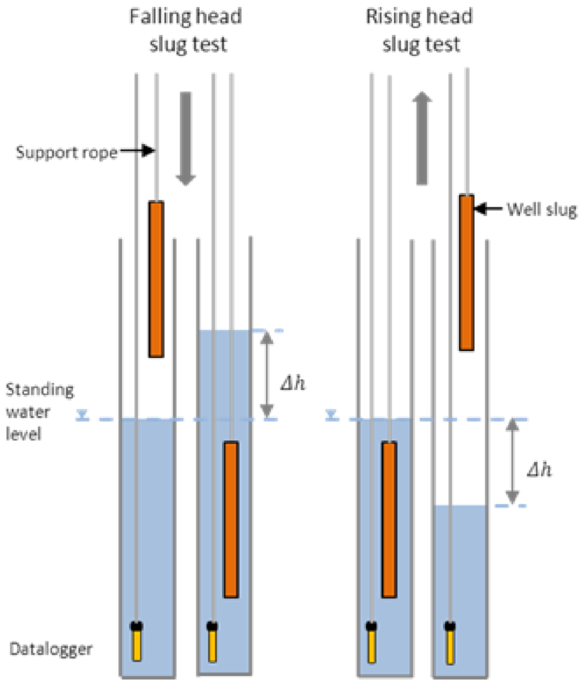


Figure 5.1 Slug test schematic

5.2 Field testing results

Slug test data from each monitoring bore were analysed using the KGS Model (1994) for analysis in unconfined and confined aquifers in AQTESOLV. AQTESOLV is the industry leading software for analysing aquifer tests using a variety of aquifer types and solutions.

A summary of the results derived from the slug tests analyses is presented in Table 5.1.

Table 5.1 Interpreted hydraulic conductivities (K)

Bore ID	Screened lithology	Groundwater system	Screen interval (m bgl)	Average K (m/day)
PF_MB01	Fractured basalt	Unconfined aquifer	5–11	6.6
PF_MB02	Slightly fractured, fresh basalt	Unconfined aquifer	12–18	$1.2.10^{-1}$
PF_MB03	Fractured/fissured basalt	Unconfined aquifer	3.5–9.5	14.0
PF_MB04A	Unconsolidated silt and clay	Aquitard	6.5–12.5	$8.7.10^{-4}$
PF_MB04B	Weakly consolidated silty clay	Aquitard	23–29	$9.8.10^{-5}$
PF_MB05	Fractured/fissured basalt	Unconfined aquifer	5–11	14.4
PF_MB06	Slightly weathered to fresh basalt	Unconfined aquifer	11–17	$1.7.10^{-1}$

Note: 1. Average values calculated from analysis of falling and rising head tests.

Results from the slug tests are consistent within similar lithologies: hydraulic conductivities are in the order of 10 m/day in the fractured basalt, 10^{-1} m/day in the unfractured fresh basalt, and 10^{-4} to 10^{-3} m/day in the unconsolidated alluvia.

The measured hydraulic conductivities are within the textbook ranges as established by Domenico & Schwartz (1990) for various materials and rocks. Some of the representative values relevant to this project (in order of highest to lowest permeability) are:

- 6.9×10^{-4} – 2.6×10^{1} m/day in fractured igneous rock;
- 3.5×10^{-2} – 1.7×10^{3} m/day in permeable basalt;
- 1.7×10^{-6} – 3.6×10^{-2} m/day in basalt;
- 8.4×10^{-5} – 1.7 m/day in unconsolidated silt; and
- 8.6×10^{-7} – 4.1×10^{-4} m/day in unconsolidated clay.

6 Groundwater quality

6.1 Sampling methodology

Groundwater sampling was undertaken using bailing techniques. Physico-chemical parameters (including pH, temperature and electrical conductivity (EC)) were measured during purging to monitor water quality changes, and to indicate representative groundwater suitable for sampling and analysis.

Water quality samples were collected in laboratory provided sample bottles, with appropriate preservation. Samples were collected and sent to the laboratory under appropriate chain-of-custody protocols.

Field and laboratory QA/QC procedures are used to establish accurate, reliable and precise results. QA/QC procedures included: calibration of equipment, submitting laboratory samples within holding times, keeping samples chilled and wearing gloves during sampling.

Groundwater samples were analysed by ALS laboratories for the suite of analytes shown in Table 6.1.

Table 6.1 Analytical suite

Suite	Analytes
Physico-chemical properties	pH, Electrical Conductivity (EC), Total Dissolved Solids (TDS)
Totals Metals	aluminium, antimony, arsenic, barium, beryllium, cadmium, chromium, cobalt, copper, iron, lead, manganese, molybdenum, nickel, selenium, silver, zinc, mercury
Asbestos	asbestos
Organics	TPH, TRH, BTEX, PAH
Pesticides	Organochlorine and organophosphorus pesticides
PCB	Total Polychlorinated Biphenyls
PFOS/PFOA	Perfluoroalkyl Sulfonic Acids, Perfluoroalkyl Carboxylic Acids, Perfluoroalkyl Sulfonamides, Fluorotelomer Sulfonic Acids

6.2 Results

Laboratory reported results of groundwater are summarised as follows:

- Groundwater is fresh to slightly brackish and slightly alkaline.
- All reported asbestos, organics, pesticides and polychlorinated biphenyls concentrations are below laboratory Limits of Reporting (LORs).
- Three locations (MB03, MB05 and MB06) reported very low per- and polyfluoroalkyl substances concentrations that are above LORs.
- Elevated levels of aluminium, chromium, copper, iron, lead, nickel and zinc indicate heavy metals were found in all shallow bores. Deep bore MB04B exhibits significantly lower heavy metals concentrations suggesting that the reported high levels in the shallow bores are likely due to contamination.

- Low to moderate concentrations of arsenic, barium, calcium, cobalt, magnesium, manganese and potassium could be naturally occurring within the geology of the site.

Table 6.2 presents a summary of the groundwater quality results. Asbestos, organics, pesticides and PCB results are not included in the table as all values were below LORs.

For information purposes and where applicable, results were compared to the ANZECC 95% freshwater guideline values for water quality (ANZECC 2000) and to the NEMP health drinking water guidelines for PFAS concentrations.

Laboratory reports are included in Annexure D of the Contamination Assessment report.

Table 6.2 Selected groundwater quality results

Parameters	Units	LOR	ANZECC 2000 FW 95%	MB01	MB02	MB03	MB04A	MB04B	MB05	MB06
pH	-	0.01		7.56	8.85	7.70	7.75	8.08	7.92	8.19
Electrical Conductivity @ 25°C	uS/cm	2		1080	352	892	885	593	912	491
Total Dissolved Solids	mg/L	10		589	226	486	504	322	528	295
Aluminium	µg/L	9	**55**	33700	1120	2680	6220	257	5420	1770
Antimony	µg/L	3		<3	<3	<3	<3	<3	<3	<3
Arsenic	µg/L	1	**13**	1	<1	<1	2	<1	<1	2
Barium	µg/L	0.5		79.3	4.2	27.4	153	22.1	31.7	12.7
Beryllium	µg/L	0.1		0.9	<0.1	0.2	0.4	<0.1	0.5	<0.1
Cadmium	µg/L	0.05	**0.2**	<0.05	<0.05	<0.05	0.12	<0.05	<0.05	<0.05
Chromium	µg/L	2	**1**	53	2	4	5	<2	9	4
Cobalt	µg/L	0.2	**1.4**	40.2	1.0	3.6	7.8	0.4	5.1	1.9
Copper	µg/L	1	**1.4**	37	2	4	8	<1	7	4
Iron	µg/L	10		30800	1020	2020	8840	280	4640	1610
Lead	µg/L	0.2	**3.4**	6.5	<0.2	2.0	7.7	<0.2	3.4	4.1
Manganese	µg/L	0.5	**1900**	883	16.3	83.2	1460	10.7	149	38.2
Mercury	µg/L	0.1	**0.06**	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Molybdenum	µg/L	1		<1	1	<1	<1	2	<1	1
Nickel	µg/L	1	**11**	130	5	15	10	3	25	12
Selenium	µg/L	1	**11**	2	<1	2	4	1	3	1
Silver	µg/L	1	**0.05**	<1	<1	<1	<1	<1	<1	<1
Zinc	µg/L	5	**8**	70	8	15	25	6	20	59

Note: Yellow highlighted cells show guideline values exceedances

Table 6.3 Selected groundwater quality results (continued)

Parameters	Units	LOR	NEMP 2018 FW 95%	MB01	MB02	MB03	MB04A	MB04B	MB05	MB06
Per- and polyfluoroalkyl substances (PFAS)										
6:2 Fluorotelomer sulfonic acid (6:2 FTS)	µg/L	0.05		<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
8:2 Fluorotelomer sulfonic acid (8:2 FTS)	µg/L	0.05		<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Perfluorohexane sulfonic acid (PFHxS)	µg/L	0.02		<0.02	<0.02	<0.02	**0.03**	**0.03**	<0.02	<0.02
Perfluorooctanesulfonic acid (PFOS)	µg/L	0.01	**0.13**	<0.01	<0.01	<0.01	**0.03**	**0.01**	<0.01	<0.01
Perfluorooctanoic acid (PFOA)	µg/L	0.01	**220**	<0.01	<0.01	<0.01	**0.03**	**0.06**	<0.01	**0.02**
10:2 Fluorotelomer sulfonic acid (10:2 FTS)	µg/L	0.05		<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
4:2 Fluorotelomer sulfonic acid (4:2 FTS)	µg/L	0.05		<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
N-Ethyl perfluorooctane sulfonamide (NEtFOSA)	µg/L	0.05		<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
N-ethyl-perfluorooctanesulfonamidoacetic acid (NEtFOSAA)	µg/L	0.02		<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02
N-ethylperfluorooctanesulfonamidoethanol (NEtFOSE)	µg/L	0.05		<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
N-Methyl perfluorooctane sulfonamide (NMeFOSA)	µg/L	0.05		<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
N-methylperfluorooctane sulfonamidoacetic acid (NMeFOSAA)	µg/L	0.02		<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02
N-Methylperfluorooctanesulfonamidoethanol (N-MeFOSE)	µg/L	0.05		<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Perfluorobutane sulfonic acid (PFBS)	µg/L	0.02		<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02
Perfluorobutanoic acid (PFBA)	µg/L	0.1		<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Perfluorodecanesulfonic acid (PFDS)	µg/L	0.02		<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02
Perfluorodecanoic acid (PFDA)	µg/L	0.02		<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02
Perfluorododecanoic acid (PFDoDA)	µg/L	0.02		<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02
Perfluoroheptane sulfonic acid (PFHpS)	µg/L	0.02		<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02
Perfluoroheptanoic acid (PFHpA)	µg/L	0.02		<0.02	<0.02	<0.02	<0.02	**0.02**	<0.02	<0.02
Perfluorohexanoic acid (PFHxA)	µg/L	0.02		<0.02	<0.02	<0.02	<0.02	**0.05**	<0.02	<0.02
Perfluorononanoic acid (PFNA)	µg/L	0.02		<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02
Perfluorooctane sulfonamide (PFOSA)	µg/L	0.02		<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02
Perfluoropentane sulfonic acid (PFPeS)	µg/L	0.02		<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02
Perfluoropentanoic acid (PFPeA)	µg/L	0.02		<0.02	<0.02	<0.02	<0.02	**0.03**	<0.02	<0.02
Perfluorotetradecanoic acid (PFTeDA)	µg/L	0.05		<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Perfluorotridecanoic acid (PFTrDA)	µg/L	0.02		<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02
Perfluoroundecanoic acid (PFUnDA)	µg/L	0.02		<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02
Sum of PFAS	**µg/L**	0.01		<0.01	<0.01	<0.01	**0.09**	**0.20**	<0.01	**0.02**

7 Conclusions

A groundwater investigation comprising seven groundwater monitoring bores was installed, developed, and tested across Polo Flat site as part of Polo Flat contamination assessment.

The investigation targeted the shallow aquifer within the fractured Tertiary Basalt and the overlying aquitard within the Quaternary Alluvium. The key findings of this program are summarised below:

- The depth to the water table within the site ranges from 5 to 10 m below ground level.
- The groundwater flow is to the west and north-west, governed by topography.
- The aquifer within the Tertiary Basalt is mostly unconfined and of low to moderate permeability. Hydraulic conductivity ranges from 0.1 m/day in fresh to slightly weathered basalt to 10 m/day in highly weathered and/or fractured basalt.
- Alluvium is only present along a segment of the eastern boundary of the site and consists of unconsolidated sandy silt and clay of very low permeability. Hydraulic conductivity is in the order of 10^{-4} to 10^{-3} m/day.
- The groundwater is fresh to slightly brackish and slightly alkaline.
- Elevated levels of aluminium, chromium, copper, iron, lead, nickel and zinc indicate heavy metals were found in all shallow bores. Deep bore MB04B exhibits significantly lower heavy metals concentrations suggesting that the reported high levels in the shallow bores could be due to contamination.

8 References

National Uniform Drillers Licensing Committee (Australian National Water Commission), 2012. Minimum Construction Requirements for Water Bores in Australia, Edition 3

Lewis and Glen 1995, Bega - Mallacoota 1:250,000 geological sheet

Tulau MJ, 1994, *Soil Landscapes of the Cooma 1:100,000 Sheet map and report*, Department of Conservation and Land Management, Sydney

Drill Log Data Source: NSW Department of Primary Industries - Office of Water / Water Administration Ministerial Corp Creative Commons 3.0 © Commonwealth of Australia

Lotsearch 2019, Environmental Risk and Planning Report, dated 2 March 2018 (Reference: LS005414 EP)

H Hyder, Z., J.J. Butler, Jr., C.D. McElwee and W. Liu, 1994. Slug tests in partially penetrating wells, Water Resources Research, vol. 30, no. 11, pp. 2945-2957

Domenico, P.A. and F.W. Schwartz, 1990. Physical and Chemical Hydrogeology, John Wiley & Sons, New York, 824p.

Australian and New Zealand Environment and Conservation Council 2000, Australian and New Zealand Guidelines for Fresh and Marine Water Quality

Australian / New Zealand Standard AS/NZS 5667.11. 1998, Water quality Sampling, Part 11: Guidance on sampling of groundwaters

Attachment A

Form As for groundwater monitoring bores

Form A Particulars of completed work

Page 1

1

Driller's Licence No: DL1913
Class of Licence: Class 4
Driller's Name: Ian Palk
Assistant Driller: Calum Roach
Contractor: Highland Drilling

New bore ☒ Replacement bore ☐
Deepened ☐ Enlarged ☐
Reconditioned ☐ Other (specify) ☐

Final Depth 13 m

2

Work Licence No: MB01
Name of Licensee: Snowy Hydro Ltd
Intended Use: Monitoring Bore
Completion Date: 27/5/19

DRILLING DETAILS 3

From (m)	To (m)	Hole Diameter (mm)	Drilling Method See Code 3
0	3	114	5
3	13	114	9

WATER BEARING ZONES 4

From (m)	To (m)	Thickness (m)	S W L (m)	Estimated Yield (L/s) Individual Aquifer	Estimated Yield (L/s) Cumulative	Test method See Code 4		D D L at end of test (m)	Duration Hrs	Duration min	Salinity (Conductivity or TDS) Cond (µS/cm)	Salinity (Conductivity or TDS) TDS (mg/L)
9	10	1	6.05	0.2	0.2	1	A				1056	

CASING / LINER DETAILS 5

Material Code 5	OD (mm)	Wall Thickness (mm)	From (m)	To (m)	Method Fixing Code 5
8	60.2	5	0	5	5
8	60.2	5	11	13	5

Casing support method See Code 5: 3
Type of casing bottom See Code 5: 2
Centralisers installed (Yes/No) No (indicate on sketch)
Sump installed (Yes/No) Yes From 11 m To 13 m
Pressure cemented (Yes/No) No From m To m
Casing Protector cemented in place

WATER ENTRY DESIGN 6

General							Screen	Slot Details		
Material Code 5	OD (mm)	Wall Thickness (mm)	From (m)	To (m)	Opening type See Code 6	Fixing See Code 5	Aperture (mm)	Length (mm)	Width (mm)	Alignment See Code 6
8	60.2	5	5	11	5	5	0.4	20	10	H

GRAVEL PACK 7

Type		Grade		Grain size (mm) From	Grain size (mm) To	Depth (m) From	Depth (m) To	Quantity Litres	Quantity m^3
Rounded	☒	Graded	☒	3	5	3	13		
Crushed	☐	Ungraded	☐						
Bentonite/Grout seal (Yes/No)			Yes			2	3		

Method of placement of Gravel Pack See Code 7: 1

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NSW GOVERNMENT Office of Water

Form A Particulars of completed work

Page 2

Work Licence No: MB01

BORE DEVELOPMENT 8

Chemical used for breaking down drilling mud (Yes/No) No Name:

Method	Bailing/Surging ☐	Jetting ☐	Airlifting ☒	Backwashing ☐	Pumping ☐	Other:
Duration	hrs	hrs	0.5 hrs	hrs	hrs	hrs

DISINFECTION ON COMPLETION 9

Chemical(s) used	Quantity applied (Litres)	Method of application

PUMPING TESTS ON COMPLETION 10

Test type		Date	Pump intake depth (m)	Initial Water Level (SWL) (m)	Pumping rate (L/s)	Water Level at end of pumping (DDL) (m)	Duration of Test (hrs)	Recovery Water level (m)	Recovery Time taken (hrs)	Recovery Time taken (mins)
Multi stage (stepped drawdown)	Stage 1									
	Stage 2									
	Stage 3									
	Stage 4									
Single stage (constant rate)										

Height of measuring point above ground level m Test Method See Code 4

WORK PARTLY BACKFILLED OR ABANDONED 11

Original depth of work: m Is work partly backfilled: (Yes/No) Yes

Is work abandoned: (Yes/No) Method of abandonment: Backfilled ☒ Plugged ☐ Capped ☐

Has any casing been left in the work (Yes/No) From m To m

Sealing / fill type See Code 11	From depth (m)	To depth (m)	Sealing / fill type See Code 11	From depth (m)	To depth (m)

Site chosen by: Hydrogeologist ☐ Geologist ☐ Driller ☐ Diviner ☐ Client ☐ Other 12

13

Lot No 14 DP No 250029

Work Location Co ordinates Easting 693090 Northing 5988456 Zone 55

GPS: (Yes/No) Yes >> AMG/AGD ☐ or MGA/GDA ☒ (See explanation)

Please mark the work site with "X" on the CLID provided map.

Indicate also the distances in metres from two (2) adjacent boundaries, and attach the map to this Form A package.

Signatures:

Driller: -- **Licensee:** --

Date: 2/07/2019 **Date:** --

Form A Particulars of completed work

Work Licence No: MB01

DRILLER'S ROCK/STRATA DESCRIPTION (LITHOLOGY)

Depth		Description See Code 15
From (m)	To (m)	
		Please see attached log

15 WORK CONSTRUCTION SKETCH

WORK NOT CONSTRUCTED BY DRILLING RIG 16

Method of excavation: Hand dug ☐ Back hoe ☐ Dragline ☐ Dozer ☐ Other

Depth (m)	Length (m)	Width (m)	Diameter (m)	Lining material	Dimentions of liner (m)	From Depth (m)	To Depth (m)

Please attach copies of the following if available 17

Geologist log	(Yes/No)	Yes	Laboratory analysis of water Sample	(Yes/No)		Pumping test(s)	(Yes/No)	
Geophysical log	(Yes/No)		Sieve analysis of aquifer material	(Yes/No)		Installed Pump details	(Yes/No)	

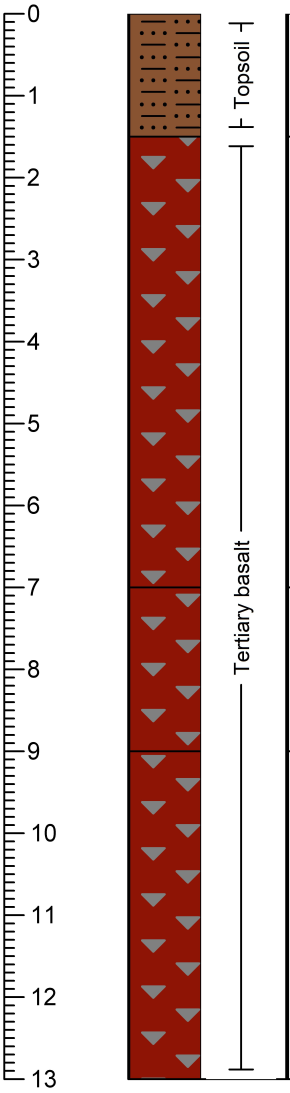
EMM
www.emmconsulting.com.au
Suite 01, 20 Chandos Street
St Leonards NSW 2065
T: 02 9493 9500
F: 02 9493 9599

WATER MONITORING BORE LOG

Bore ID: MB01

Client: Default Listing
Project: Snowy Hydro 2.0
Date completed: 27/05/2019
Drilling contractor: Highland Drilling
Drilling method: Default Listing
Hydrogeologist: C Corthier
Project number: J17188
Elevation: 820 m AHD
Easting: 693090
Northing: 5988456
Static Water Level: 6.05 m bgl
Total depth: 13 m
Screened Formation: Tertiary Basalt
Screened depth: 5 - 11 m
Date: 06/06/2019
Casing: 50 mm PVC

Depth (mbgl)	Lithology Graphic	Description	Drilling Notes	Bore Completion	
				Diagram	Design notes



TOPSOIL, brown, unconsolidated, clay

BASALT, dark grey, fine-grained, fresh, dry

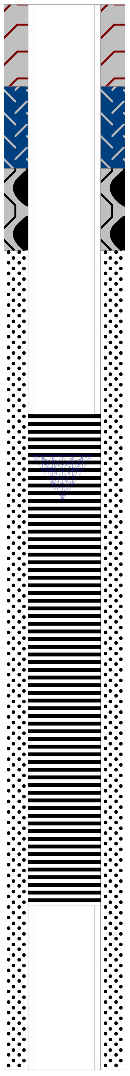
BASALT, dark grey, fine-grained, highly weathered, damp

Minor QUARTZ, light grey, very coarse-grained, sub-angular

BASALT, dark grey, fine-grained, moderately to highly weathered, wet

Minor QUARTZ, light grey, very coarse grained, sub-angular

Water Cut: 0.2 L/s, T: 13.1^{o}C, EC: 1056 µS/cm, pH: 8.0



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Form A Particulars of completed work

Page 1

1

Driller's Licence No: DL1913
Class of Licence: Class 4
Driller's Name: Ian Palk
Assistant Driller: Calum Roach
Contractor: Highland Drilling

New bore	☒	Replacement bore	☐
Deepened	☐	Enlarged	☐
Reconditioned	☐	Other (specify)	☐

Final Depth 18 m

2

Work Licence No: MB02
Name of Licensee: Snowy Hydro Ltd
Intended Use: Monitoring Bore
Completion Date: 28/5/19

DRILLING DETAILS 3

From (m)	To (m)	Hole Diameter (mm)	Drilling Method See Code 3
0	1	114	5
1	6	114	9
6	19	114	5

WATER BEARING ZONES 4

From (m)	To (m)	Thickness (m)	S W L (m)	Estimated Yield (L/s)		Test method		D D L at end of test (m)	Duration		Salinity (Conductivity or TDS)	
				Individual Aquifer	Cumulative	See Code 4			Hrs	min	Cond (µS/cm)	TDS (mg/L)
15	16	1	9.76	0.1	0.1	1	A				318	

CASING / LINER DETAILS 5

Material Code 5	OD (mm)	Wall Thickness (mm)	From (m)	To (m)	Method Fixing Code 5
8	60.2	5	0	12	5
8	60.2	5	18	19	5

Casing support method See Code 5 3
Type of casing bottom See Code 5 2

Centralisers installed	{Yes/No}	No	(indicate on sketch)					
Sump installed	{Yes/No}	Yes	From	18	m	To	19	m
Pressure cemented	{Yes/No}	No	From		m	To		m

Casing Protector cemented in place

WATER ENTRY DESIGN 6

General							Screen	Slot Details		
Material Code 5	OD (mm)	Wall Thickness (mm)	From (m)	To (m)	Opening type See Code 6	Fixing See Code 5	Aperture (mm)	Length (mm)	Width (mm)	Alignment See Code 6
8	60.2	5	12	18	5	5	0.4	20	10	H

GRAVEL PACK 7

Type		Grade		Grain size (mm)		Depth (m)		Quantity	
				From	To	From	To	Litres	m^3
Rounded	☒	Graded	☒	3	5	9	19		
Crushed	☐	Ungraded	☐						
Bentonite/Grout seal		(Yes/No)	Yes			8	9		

Method of placement of Gravel Pack See Code 7 1

For Departmental use only: G W

NSW GOVERNMENT Office of Water

Form A Particulars of completed work

Work Licence No: MB02

BORE DEVELOPMENT 8

Chemical used for breaking down drilling mud (Yes/No) No Name:

Method	Bailing/Surging ☐	Jetting ☐	Airlifting ☒	Backwashing ☐	Pumping ☐	Other:
Duration	hrs	hrs	0.5 hrs	hrs	hrs	hrs

DISINFECTION ON COMPLETION 9

Chemical(s) used	Quantity applied (Litres)	Method of application

PUMPING TESTS ON COMPLETION 10

Test type		Date	Pump intake depth (m)	Initial Water Level (SWL) (m)	Pumping rate (L/s)	Water Level at end of pumping (DDL) (m)	Duration of Test (hrs)	Recovery Water level (m)	Recovery Time taken (hrs)	Recovery Time taken (mins)
Multi stage (stepped drawdown)	Stage 1									
	Stage 2									
	Stage 3									
	Stage 4									
Single stage (constant rate)										

Height of measuring point above ground level m Test Method See Code 4

WORK PARTLY BACKFILLED OR ABANDONED 11

Original depth of work: m Is work partly backfilled: (Yes/No) Yes

Is work abandoned: (Yes/No) Method of abandonment: Backfilled ☒ Plugged ☐ Capped ☐

Has any casing been left in the work (Yes/No) From m To m

Sealing / fill type See Code 11	From depth (m)	To depth (m)	Sealing / fill type See Code 11	From depth (m)	To depth (m)

Site chosen by: Hydrogeologist ☐ Geologist ☐ Driller ☐ Diviner ☐ Client ☐ Other 12

13

Lot No 14 DP No 250029

Work Location Co ordinates Easting 693354 Northing 5988363 Zone 55

GPS: (Yes/No) Yes >> AMG/AGD ☐ or MGA/GDA ☒ (See explanation)

Please mark the work site with "X" on the CLID provided map.

Indicate also the distances in metres from two (2) adjacent boundaries, and attach the map to this Form A package.

Signatures:

Driler: -- **Licensee:** --

Date: 26/07/2019 **Date:** --

Form A Particulars of completed work

Work Licence No: MB02

DRILLER'S ROCK/STRATA DESCRIPTION (LITHOLOGY)

Depth		Description See Code 15
From (m)	To (m)	
		Please see attached log

15 WORK CONSTRUCTION SKETCH

WORK NOT CONSTRUCTED BY DRILLING RIG 16

Method of excavation: Hand dug ☐ Back hoe ☐ Dragline ☐ Dozer ☐ Other ____

Depth (m)	Length (m)	Width (m)	Diameter (m)	Lining material	Dimentions of liner (m)	From Depth (m)	To Depth (m)

Please attach copies of the following if available 17

Geologist log	(Yes/No)	Yes	Laboratory analysis of water Sample	(Yes/No)		Pumping test(s)	(Yes/No)	
Geophysical log	(Yes/No)		Sieve analysis of aquifer material	(Yes/No)		Installed Pump details	(Yes/No)	

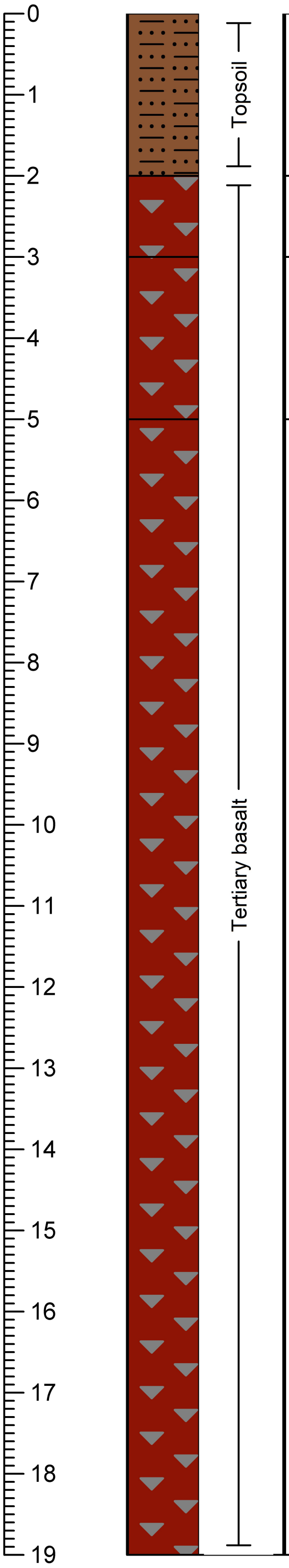
WATER MONITORING BORE LOG

Bore ID: MB02

www.emmconsulting.com.au
Suite 01, 20 Chandos Street
St Leonards NSW 2065
T: 02 9493 9500
F: 02 9493 9599

Client: Default Listing
Project: Snowy Hydro 2.0
Date completed: 28/05/2019
Drilling contractor: Highland Drilling
Drilling method: Default Listing
Hydrogeologist: C Corthier
Project number: J17188
Elevation: 823.8 m AHD
Easting: 693354
Northing: 5988363
Static Water Level: 9.76 m bgl
Total depth: 19 m
Screened Formation: Tertiary Basalt
Screened depth: 12 - 18 m
Date: 06/06/2019
Casing: 50 mm PVC

Depth (mbgl)	Lithology Graphic	Description	Drilling Notes	Bore Completion Diagram	Bore Completion Design notes



TOPSOIL, brown, unconsolidated, clay

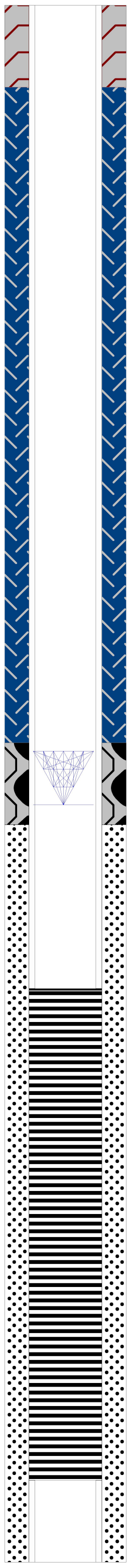
BASALT, dark bluish grey, fine-grained, fresh, dry

BASALT, bluish grey, fine-grained, slightly to moderately weathered, dry

Trace QUARTZ, very light grey, coarse grained, angular

BASALT, dark bluish grey, fine-grained, fresh, possibly minor fractures at 10m, damp

Water Cut: 0.1 L/s, T: 9.8°C, EC: 318 µS/cm, pH: 9.6



NSW GOVERNMENT | Office of Water

Form A Particulars of completed work

Page 1

1

Driller's Licence No: DL1913
Class of Licence: Class 4
Driller's Name: Ian Palk
Assistant Driller: Calum Roach
Contractor: Highland Drilling

New bore ☒ Replacement bore ☐
Deepened ☐ Enlarged ☐
Reconditioned ☐ Other (specify) ☐

Final Depth 11 **m**

2

Work Licence No: MB03
Name of Licensee: Snowy Hydro Ltd
Intended Use: Monitoring Bore
Completion Date: 29/5/19

DRILLING DETAILS **3**

From (m)	To (m)	Hole Diameter (mm)	Drilling Method See Code 3
0	1	114	5
1	11	114	9

WATER BEARING ZONES **4**

From (m)	To (m)	Thickness (m)	S W L (m)	Estimated Yield (L/s) Individual Aquifer	Estimated Yield (L/s) Cumulative	Test method See Code 4		D D L at end of test (m)	Duration Hrs	Duration min	Salinity (Conductivity or TDS) Cond (µS/cm)	Salinity (Conductivity or TDS) TDS (mg/L)
6	7	1	4.96	0.1	0.1	1	A				649	

CASING / LINER DETAILS **5**

Material Code 5	OD (mm)	Wall Thickness (mm)	From (m)	To (m)	Method Fixing Code 5
8	60.2	5	0	3.5	5
8	60.2	5	9.5	11	5

Casing support method See Code 5: 3
Type of casing bottom See Code 5: 2
Centralisers installed (Yes/No) No (indicate on sketch)
Sump installed (Yes/No) Yes From 9.5 **m** To 11 **m**
Pressure cemented (Yes/No) No From **m** To **m**
Casing Protector cemented in place

WATER ENTRY DESIGN **6**

General Material Code 5	OD (mm)	Wall Thickness (mm)	From (m)	To (m)	Opening type See Code 6	Fixing See Code 5	Screen Aperture (mm)	Slot Details Length (mm)	Slot Details Width (mm)	Slot Details Alignment See Code 6
8	60.2	5	3.5	9.5	5	5	0.4	20	10	H

GRAVEL PACK **7**

Type		Grade		Grain size (mm) From	Grain size (mm) To	Depth (m) From	Depth (m) To	Quantity Litres	Quantity m³
Rounded	☒	Graded	☒	3	5	1.5	11		
Crushed	☐	Ungraded	☐						
Bentonite/Grout seal (Yes/No)			Yes			0.5	1.5		

Method of placement of Gravel Pack See Code 7: 1

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NSW GOVERNMENT Office of Water

Form A Particulars of completed work

Page 2

Work Licence No: MB03

BORE DEVELOPMENT 8

Chemical used for breaking down drilling mud (Yes/No) No Name:

Method	Bailing/Surging ☐		Jetting ☐		Airlifting ☒		Backwashing ☐		Pumping ☐		Other:
Duration		hrs		hrs	0.5	hrs		hrs		hrs	hrs

DISINFECTION ON COMPLETION 9

Chemical(s) used	Quantity applied (Litres)	Method of application

PUMPING TESTS ON COMPLETION 10

Test type		Date	Pump intake depth (m)	Initial Water Level (SWL) (m)	Pumping rate (L/s)	Water Level at end of pumping (DDL) (m)	Duration of Test (hrs)	Recovery Water level (m)	Recovery Time taken (hrs)	Recovery Time taken (mins)
Multi stage (stepped drawdown)	Stage 1									
	Stage 2									
	Stage 3									
	Stage 4									
Single stage (constant rate)										

Height of measuring point above ground level m Test Method See Code 4

WORK PARTLY BACKFILLED OR ABANDONED 11

Original depth of work: m Is work partly backfilled: (Yes/No) Yes

Is work abandoned: (Yes/No) Method of abandonment: Backfilled ☒ Plugged ☐ Capped ☐

Has any casing been left in the work (Yes/No) From m To m

Sealing / fill type See Code 11	From depth (m)	To depth (m)	Sealing / fill type See Code 11	From depth (m)	To depth (m)

Site chosen by: Hydrogeologist ☐ Geologist ☐ Driller ☐ Diviner ☐ Client ☐ Other 12

13

Lot No 14 DP No 250029

Work Location Co ordinates Easting 693004 Northing 5988195 Zone 55

GPS: (Yes/No) Yes >> AMG/AGD ☐ or MGA/GDA ☒ (See explanation)

Please mark the work site with "X" on the CLID provided map.

Indicate also the distances in metres from two (2) adjacent boundaries, and attach the map to this Form A package.

Signatures:

Driller: -- **Licensee:** --

Date: 26/07/2019 **Date:** --

Form A Particulars of completed work

Work Licence No: MB03

DRILLER'S ROCK/STRATA DESCRIPTION (LITHOLOGY)

Depth From (m)	Depth To (m)	Description (See Code 15)
		Please see attached log

15 WORK CONSTRUCTION SKETCH

16 WORK NOT CONSTRUCTED BY DRILLING RIG

Method of excavation: Hand dug ☐ Back hoe ☐ Dragline ☐ Dozer ☐ Other

Depth (m)	Length (m)	Width (m)	Diameter (m)	Lining material	Dimentions of liner (m)	From Depth (m)	To Depth (m)

17 Please attach copies of the following if available

Geologist log (Yes/No)	Yes	Laboratory analysis of water Sample (Yes/No)		Pumping test(s) (Yes/No)	
Geophysical log (Yes/No)		Sieve analysis of aquifer material (Yes/No)		Installed Pump details (Yes/No)	

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Suite 01, 20 Chandos Street
St Leonards NSW 2065
T: 02 9493 9500
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WATER MONITORING BORE LOG

Bore ID: MB03

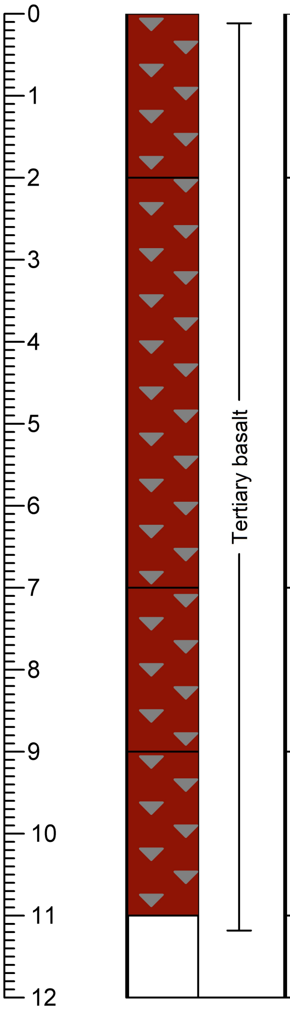
Client: Snowy Hydro Ltd
Project: Snowy Hydro 2.0

Date completed: 29/05/2019
Drilling contractor: Highland Drilling
Drilling method: Air Rotary
Hydrogeologist: C Corthier

Project number: J17188
Elevation (mAHD): 818.9 m AHD
Easting: 693004
Northing: 5988195

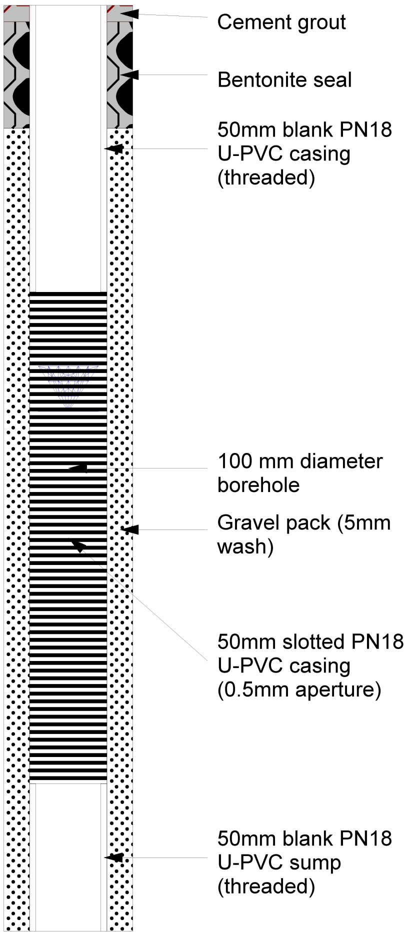
Static Water Level (mBGL): 4.96 m bgl
Total depth (mBGL): 11 m
Open Formation: Tertiary Basalt
Open Depth (mBGL): 3.5 - 9.5 m
Date: 06/06/2019
Casing: 50 mm PVC

Depth (mBGL)	Lithology Graphic	Description	Water Quality
		BASALT, dark grey, fine-grained, slightly weathered to fresh, dry	
		BASALT, clayey, medium grey, fine-grained, moderately to highly weathered, dry Minor QUARTZ, very light grey, very coarse-grained, angular	Water Cut: 0.1 L/s, T: 12.0^{o}C, EC: 649 µS/cm, pH: 8.6
		BASALT, clayey, medium grey, fine-grained, moderately to highly weathered, minor oxidation, wet	
		BASALT, greyish black, fine-grained, fresh, minor oxidation, wet Trace QUARTZ, white, very coarse-grained, angular	



Bore Completion

Diagram	Design notes



Form A Particulars of completed work

Page 1

1

Driller's Licence No:	DL1913
Class of Licence:	Class 4
Driller's Name:	Ian Palk
Assistant Driller:	Calum Roach
Contractor:	Highland Drilling

New bore	☒	Replacement bore	☐
Deepened	☐	Enlarged	☐
Reconditioned	☐	Other (specify)	☐

Final Depth 13.5 **m**

2

Work Licence No:	MB04A
Name of Licensee:	Snowy Hydro Ltd
Intended Use:	Monitoring Bore
Completion Date:	28/5/19

DRILLING DETAILS **3**

From (m)	To (m)	Hole Diameter (mm)	Drilling Method See Code 3
0	1	114	5
1	9	114	9
9	13.5	114	5

WATER BEARING ZONES **4**

From (m)	To (m)	Thickness (m)	S W L (m)	Estimated Yield (L/s) Individual Aquifer	Estimated Yield (L/s) Cumulative	Test method See Code 4		D D L at end of test (m)	Duration Hrs	Duration min	Salinity (Conductivity or TDS) Cond (µS/cm)	Salinity (Conductivity or TDS) TDS (mg/L)
10	11	1	6.6	<0.1	<0.1	1	A					

CASING / LINER DETAILS **5**

Material Code 5	OD (mm)	Wall Thickness (mm)	From (m)	To (m)	Method Fixing Code 5
8	60.2	5	0	6.5	5
8	60.2	5	12.5	13.5	5

Casing support method See Code 5 **3**

Type of casing bottom See Code 5 **2**

Centralisers installed	{Yes/No}	No	(indicate on sketch)					
Sump installed	{Yes/No}	Yes	From	12.5	**m**	To	13.5	**m**
Pressure cemented	{Yes/No}	No	From		**m**	To		**m**

Casing Protector cemented in place

WATER ENTRY DESIGN **6**

General Material Code 5	OD (mm)	Wall Thickness (mm)	From (m)	To (m)	Opening type See Code 6	Fixing See Code 5	Screen Aperture (mm)	Slot Details Length (mm)	Width (mm)	Alignment See Code 6
8	60.2	5	6.5	12.5	5	5	0.4	20	10	H

GRAVEL PACK **7**

Type		Grade		Grain size (mm) From	Grain size (mm) To	Depth (m) From	Depth (m) To	Quantity Litres	Quantity m^3
Rounded	☒	Graded	☒	3	5	4	13.5		
Crushed	☐	Ungraded	☐						
Bentonite/Grout seal	(Yes/No)	Yes				3	4		

Method of placement of Gravel Pack See Code 7 **1**

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NSW GOVERNMENT | Office of Water

Form A Particulars of completed work

Work Licence No: MB04A

BORE DEVELOPMENT 8

Chemical used for breaking down drilling mud (Yes/No) No Name:

Method	Bailing/Surging ☐	Jetting ☐	Airlifting ☒	Backwashing ☐	Pumping ☐	Other:
Duration	hrs	hrs	0.5 hrs	hrs	hrs	hrs

DISINFECTION ON COMPLETION 9

Chemical(s) used	Quantity applied (Litres)	Method of application

PUMPING TESTS ON COMPLETION 10

Test type		Date	Pump intake depth (m)	Initial Water Level (SWL) (m)	Pumping rate (L/s)	Water Level at end of pumping (DDL) (m)	Duration of Test (hrs)	Recovery Water level (m)	Recovery Time taken (hrs)	Recovery Time taken (mins)
Multi stage (stepped drawdown)	Stage 1									
	Stage 2									
	Stage 3									
	Stage 4									
Single stage (constant rate)										

Height of measuring point above ground level m Test Method See Code 4

WORK PARTLY BACKFILLED OR ABANDONED 11

Original depth of work: m Is work partly backfilled: (Yes/No) Yes

Is work abandoned: (Yes/No) Method of abandonment: Backfilled ☒ Plugged ☐ Capped ☐

Has any casing been left in the work (Yes/No) From m To m

Sealing / fill type See Code 11	From depth (m)	To depth (m)	Sealing / fill type See Code 11	From depth (m)	To depth (m)

Site chosen by: Hydrogeologist ☐ Geologist ☐ Driller ☐ Diviner ☐ Client ☐ Other 12

13

Lot No	14	DP No	250029		
Work Location Co ordinates	Easting	693394	Northing	5988023	Zone 55

GPS: (Yes/No) Yes >> AMG/AGD ☐ or MGA/GDA ☒ (See explanation)

Please mark the work site with "X" on the CLID provided map.

Indicate also the distances in metres from two (2) adjacent boundaries, and attach the map to this Form A package.

Signatures:

Driller: --

Date: 26/07/2019

Licensee: --

Date: --

Form A Particulars of completed work

Work Licence No: MB04A

DRILLER'S ROCK/STRATA DESCRIPTION (LITHOLOGY)

Depth From (m)	Depth To (m)	Description (See Code 15)
		Please see attached log

WORK CONSTRUCTION SKETCH

15

WORK NOT CONSTRUCTED BY DRILLING RIG

16

Method of excavation: Hand dug ☐ Back hoe ☐ Dragline ☐ Dozer ☐ Other

Depth (m)	Length (m)	Width (m)	Diameter (m)	Lining material	Dimentions of liner (m)	From Depth (m)	To Depth (m)

Please attach copies of the following if available

17

Geologist log	(Yes/No) Yes	Laboratory analysis of water Sample	(Yes/No)	Pumping test(s)	(Yes/No)
Geophysical log	(Yes/No)	Sieve analysis of aquifer material	(Yes/No)	Installed Pump details	(Yes/No)

EMM

www.emmconsulting.com.au
Suite 01, 20 Chandos Street
St Leonards NSW 2065
T: 02 9493 9500
F: 02 9493 9599

WATER MONITORING BORE LOG

Bore ID: MB04A

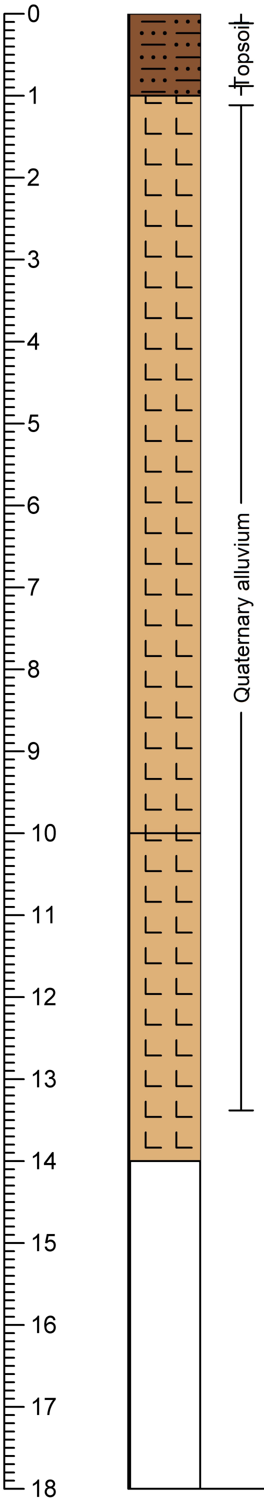
Client: Default Listing
Project: Snowy Hydro 2.0

Date completed: 28/05/2019
Drilling contractor: Highland Drilling
Drilling method: Default Listing
Hydrogeologist: C Corthier

Project number: J17188
Elevation: 825.4 m AHD
Easting: 693394
Northing: 5988023

Static Water Level: 6.60 m bgl
Total depth: 13.5 m
Screened Formation: Quaternary Alluvium
Screened depth: 6.5 - 12.5 m
Date: 06/06/2019
Casing: 50 mm PVC

Depth (mbgl)	Lithology Graphic	Description	Drilling Notes	Bore Completion: Diagram	Bore Completion: Design notes

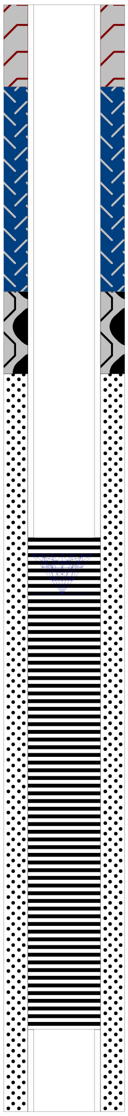


TOPSOIL, brown, unconsolidated clay

SILTY CLAY, yellowish orange, unconsolidated, dry

SILTY CLAY, brownish orange, locally red, unconsolidated, wet

Water Cut: <0.1 L/s



NSW GOVERNMENT Office of Water

Form A Particulars of completed work

Page 1

1

Driller's Licence No: DL1913
Class of Licence: Class 4
Driller's Name: Ian Palk
Assistant Driller: Calum Roach
Contractor: Highland Drilling

New bore	☒	Replacement bore	☐
Deepened	☐	Enlarged	☐
Reconditioned	☐	Other (specify)	☐

Final Depth 30 m

2

Work Licence No: MB04B
Name of Licensee: Snowy Hydro Ltd
Intended Use: Monitoring Bore
Completion Date: 30/5/19

DRILLING DETAILS

3

From (m)	To (m)	Hole Diameter (mm)	Drilling Method See Code 3
0	19.3	114	5
19.3	30	114	9

WATER BEARING ZONES

4

From (m)	To (m)	Thickness (m)	S W L (m)	Estimated Yield (L/s) Individual Aquifer	Estimated Yield (L/s) Cumulative	Test method See Code 4		D D L at end of test (m)	Duration Hrs	Duration min	Salinity (Conductivity or TDS) Cond (µS/cm)	Salinity (Conductivity or TDS) TDS (mg/L)
						1	A					

CASING / LINER DETAILS

5

Material Code 5	OD (mm)	Wall Thickness (mm)	From (m)	To (m)	Method Fixing Code 5
8	60.2	5	0	23	5
8	60.2	5	29	30	5

Casing support method See Code 5: 3
Type of casing bottom See Code 5: 2
Centralisers installed {Yes/No} No (indicate on sketch)
Sump installed {Yes/No} Yes From 29 m To 30 m
Pressure cemented {Yes/No} No From m To m
Casing Protector cemented in place

WATER ENTRY DESIGN

6

General							Screen	Slot Details		
Material Code 5	OD (mm)	Wall Thickness (mm)	From (m)	To (m)	Opening type See Code 6	Fixing See Code 5	Aperture (mm)	Length (mm)	Width (mm)	Alignment See Code 6
8	60.2	5	23	29	5	5	0.4	20	10	H

GRAVEL PACK

7

Type		Grade		Grain size (mm) From	Grain size (mm) To	Depth (m) From	Depth (m) To	Quantity Litres	Quantity m^3
Rounded	☒	Graded	☒	3	5	20	30		
Crushed	☐	Ungraded	☐						

Bentonite/Grout seal (Yes/No) Yes — Depth From 18 To 20
Method of placement of Gravel Pack See Code 7: 1

For Departmental use only: G W ☐☐☐☐☐☐☐

Form A Particulars of completed work

Work Licence No: MB04B

BORE DEVELOPMENT 8

Chemical used for breaking down drilling mud (Yes/No) No Name:

Method	Bailing/Surging ☐	Jetting ☐	Airlifting ☒	Backwashing ☐	Pumping ☐	Other:
Duration	hrs	hrs	0.5 hrs	hrs	hrs	hrs

DISINFECTION ON COMPLETION 9

Chemical(s) used	Quantity applied (Litres)	Method of application

PUMPING TESTS ON COMPLETION 10

Test type		Date	Pump intake depth (m)	Initial Water Level (SWL) (m)	Pumping rate (L/s)	Water Level at end of pumping (DDL) (m)	Duration of Test (hrs)	Recovery Water level (m)	Recovery Time taken (hrs)	(mins)
Multi stage (stepped drawdown)	Stage 1									
	Stage 2									
	Stage 3									
	Stage 4									
Single stage (constant rate)										

Height of measuring point above ground level m Test Method See Code 4

WORK PARTLY BACKFILLED OR ABANDONED 11

Original depth of work: m Is work partly backfilled: (Yes/No) Yes

Is work abandoned: (Yes/No) Method of abandonment: Backfilled ☒ Plugged ☐ Capped ☐

Has any casing been left in the work (Yes/No) From m To m

Sealing / fill type See Code 11	From depth (m)	To depth (m)	Sealing / fill type See Code 11	From depth (m)	To depth (m)

12

Site chosen by: Hydrogeologist ☐ Geologist ☐ Driller ☐ Diviner ☐ Client ☐ Other

13

Lot No 14 DP No 250029

Work Location Co ordinates Easting 693391 Northing 5988024 Zone 55

GPS: (Yes/No) Yes >> AMG/AGD ☐ or MGA/GDA ☒ (See explanation)

Please mark the work site with "X" on the CLID provided map.

Indicate also the distances in metres from two (2) adjacent boundaries, and attach the map to this Form A package.

Signatures:

Driller: -- **Licensee:** --

Date: 26/07/2019 **Date:** --

Form A Particulars of completed work

Work Licence No: MB04B

DRILLER'S ROCK/STRATA DESCRIPTION (LITHOLOGY)

Depth From (m)	Depth To (m)	Description See Code 15
		Please see attached log

WORK CONSTRUCTION SKETCH

15

WORK NOT CONSTRUCTED BY DRILLING RIG

16

Method of excavation: Hand dug ☐ Back hoe ☐ Dragline ☐ Dozer ☐ Other ☐

Depth (m)	Length (m)	Width (m)	Diameter (m)	Lining material	Dimentions of liner (m)	From Depth (m)	To Depth (m)

Please attach copies of the following if available

17

Geologist log	(Yes/No) Yes	Laboratory analysis of water Sample	(Yes/No)	Pumping test(s)	(Yes/No)
Geophysical log	(Yes/No)	Sieve analysis of aquifer material	(Yes/No)	Installed Pump details	(Yes/No)

www.emmconsulting.com.au
Suite 01, 20 Chandos Street
St Leonards NSW 2065
T: 02 9493 9500
F: 02 9493 9599

WATER MONITORING BORE LOG

Bore ID: MB04B

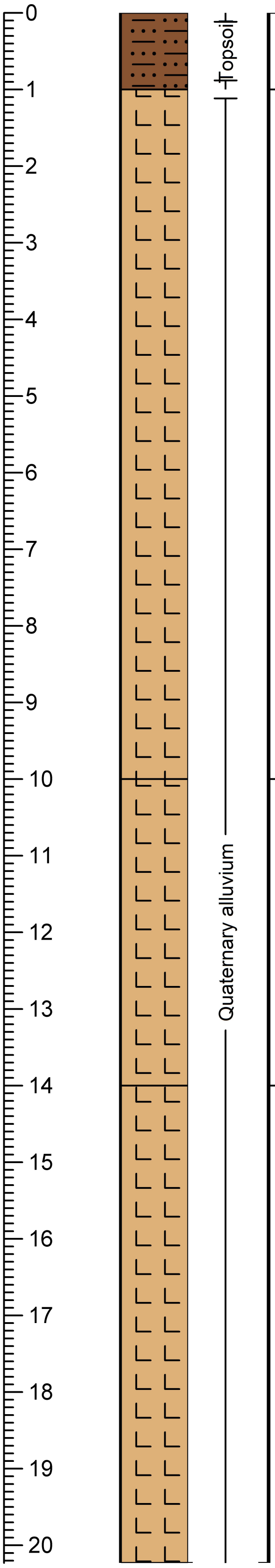
Client: Default Listing
Project: Snowy Hydro 2.0

Date completed: 30/05/2019
Drilling contractor: Highland Drilling
Drilling method: Default Listing
Hydrogeologist: C Corthier

Project number: J17188
Elevation: 825.3 m AHD
Easting: 693391
Northing: 5988024

Static Water Level: 8.67 m bgl
Total depth: 30 m
Screened Formation: Tertiary Basalt
Screened depth: 23 - 29 m
Date: 06/06/2019
Casing: 50 mm PVC

Depth (mbgl)	Lithology Graphic	Description	Drilling Notes	Bore Completion Diagram	Design notes

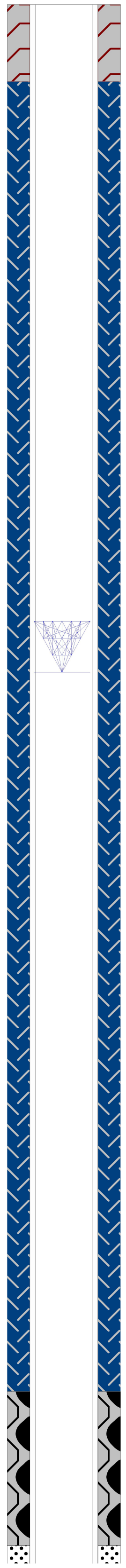


TOPSOIL, brown, unconsolidated clay

SILTY CLAY, yellowish orange, unconsolidated, dry

SANDY CLAYEY SILT, reddish orange, weakly consolidated, dry

SANDY CLAYEY SILT, yellowish orange, weakly consolidated, damp



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WATER MONITORING BORE LOG

Bore ID: MB04B

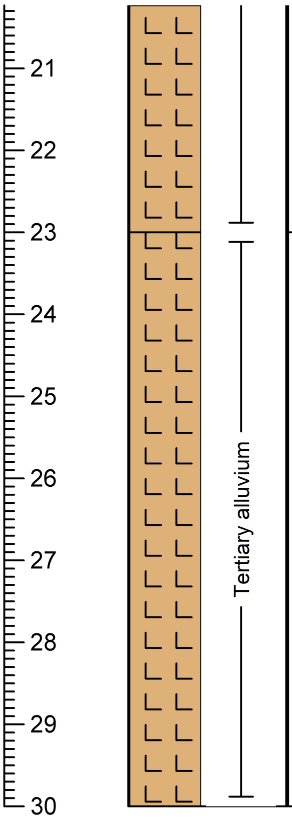
Client: Default Listing
Project: Snowy Hydro 2.0

Date completed: 30/05/2019
Drilling contractor: Highland Drilling
Drilling method: Default Listing
Hydrogeologist: C Corthier

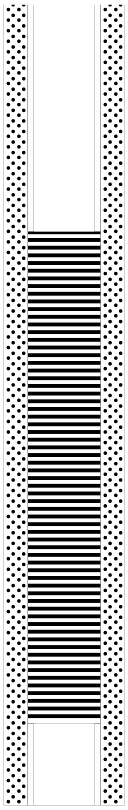
Project number: J17188
Elevation: 825.3 m AHD
Easting: 693391
Northing: 5988024

Static Water Level: 8.67 m bgl
Total depth: 30 m
Screened Formation: Tertiary Basalt
Screened depth: 23 - 29 m
Date: 06/06/2019
Casing: 50 mm PVC

Depth (mbgl)	Lithology Graphic	Description	Drilling Notes	Bore Completion	
				Diagram	Design notes



SILTY CLAY, very light bluish grey, weakly consolidated, damp



Form A Particulars of completed work

Page 1

1

Driller's Licence No: DL1913
Class of Licence: Class 4
Driller's Name: Ian Palk
Assistant Driller: Calum Roach
Contractor: Highland Drilling

New bore	☒	Replacement bore	☐
Deepened	☐	Enlarged	☐
Reconditioned	☐	Other (specify)	☐

Final Depth 12.5 **m**

2

Work Licence No: MB05
Name of Licensee: Snowy Hydro Ltd
Intended Use: Monitoring Bore
Completion Date: 29/5/19

DRILLING DETAILS

3

From (m)	To (m)	Hole Diameter (mm)	Drilling Method See Code 3
0	2	114	**5**
2	12.5	114	**9**

WATER BEARING ZONES

4

From (m)	To (m)	Thickness (m)	S W L (m)	Estimated Yield (L/s) Individual Aquifer	Estimated Yield (L/s) Cumulative	Test method See Code 4		D D L at end of test (m)	Duration Hrs	Duration min	Salinity (Conductivity or TDS) Cond (µS/cm)	Salinity (Conductivity or TDS) TDS (mg/L)
10	11	1	6.69	0.1	0.1	**1**	**A**				688	

CASING / LINER DETAILS

5

Material Code 5	OD (mm)	Wall Thickness (mm)	From (m)	To (m)	Method Fixing Code 5
8	60.2	5	0	5	**5**
8	60.2	5	11	12.5	**5**

Casing support method See Code 5 **3**

Type of casing bottom See Code 5 **2**

Centralisers installed (Yes/No) No (indicate on sketch)

Sump installed (Yes/No) Yes From 11 **m** To 12.5 **m**

Pressure cemented (Yes/No) No From **m** To **m**

Casing Protector cemented in place

WATER ENTRY DESIGN

6

General							Screen	Slot Details		
Material Code 5	OD (mm)	Wall Thickness (mm)	From (m)	To (m)	Opening type See Code 6	Fixing See Code 5	Aperture (mm)	Length (mm)	Width (mm)	Alignment See Code 6
8	60.2	5			**5**	**5**	0.4	20	10	**H**

GRAVEL PACK

7

Type		Grade		Grain size (mm) From	Grain size (mm) To	Depth (m) From	Depth (m) To	Quantity Litres	Quantity m^3
Rounded	☒	Graded	☒	3	5	3	12.5		
Crushed	☐	Ungraded	☐						
Bentonite/Grout seal (Yes/No)		Yes				2	3		

Method of placement of Gravel Pack See Code 7 **1**

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NSW GOVERNMENT Office of Water

Form A Particulars of completed work

Work Licence No: MB05

BORE DEVELOPMENT 8

Chemical used for breaking down drilling mud (Yes/No) No Name:

Method	Bailing/Surging ☐	Jetting ☐	Airlifting ☒	Backwashing ☐	Pumping ☐	Other:
Duration	hrs	hrs	0.5 hrs	hrs	hrs	hrs

DISINFECTION ON COMPLETION 9

Chemical(s) used	Quantity applied (Litres)	Method of application

PUMPING TESTS ON COMPLETION 10

Test type		Date	Pump intake depth (m)	Initial Water Level (SWL) (m)	Pumping rate (L/s)	Water Level at end of pumping (DDL) (m)	Duration of Test (hrs)	Recovery Water level (m)	Recovery Time taken (hrs)	Recovery Time taken (mins)
Multi stage (stepped drawdown)	Stage 1									
	Stage 2									
	Stage 3									
	Stage 4									
Single stage (constant rate)										

Height of measuring point above ground level m Test Method See Code 4

WORK PARTLY BACKFILLED OR ABANDONED 11

Original depth of work: m Is work partly backfilled: (Yes/No) Yes

Is work abandoned: (Yes/No) Method of abandonment: Backfilled ☒ Plugged ☐ Capped ☐

Has any casing been left in the work (Yes/No) From m To m

Sealing / fill type See Code 11	From depth (m)	To depth (m)	Sealing / fill type See Code 11	From depth (m)	To depth (m)

Site chosen by: Hydrogeologist ☐ Geologist ☐ Driller ☐ Diviner ☐ Client ☐ Other 12

13

Lot No 14 DP No 250029

Work Location Co ordinates Easting 692962 Northing 5987797 Zone 55

GPS: (Yes/No) Yes >> AMG/AGD ☐ or MGA/GDA ☒ (See explanation)

Please mark the work site with "X" on the CLID provided map.

Indicate also the distances in metres from two (2) adjacent boundaries, and attach the map to this Form A package.

Signatures:

Driller: -- **Licensee:** --

Date: 26/07/2019 **Date:** --

Form A Particulars of completed work

Work Licence No: MB05

DRILLER'S ROCK/STRATA DESCRIPTION (LITHOLOGY)

15 **WORK CONSTRUCTION SKETCH**

Depth		**Description**
From (m)	To (m)	See Code 15
		Please see attached log

WORK NOT CONSTRUCTED BY DRILLING RIG

16

Method of excavation: Hand dug ☐ Back hoe ☐ Dragline ☐ Dozer ☐ Other ______

Depth (m)	Length (m)	Width (m)	Diameter (m)	Lining material	Dimentions of liner (m)	From Depth (m)	To Depth (m)

Please attach copies of the following if available

17

Geologist log	(Yes/No) Yes	Laboratory analysis of water Sample	(Yes/No)	Pumping test(s)	(Yes/No)
Geophysical log	(Yes/No)	Sieve analysis of aquifer material	(Yes/No)	Installed Pump details	(Yes/No)

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WATER MONITORING BORE LOG

Bore ID: MB05

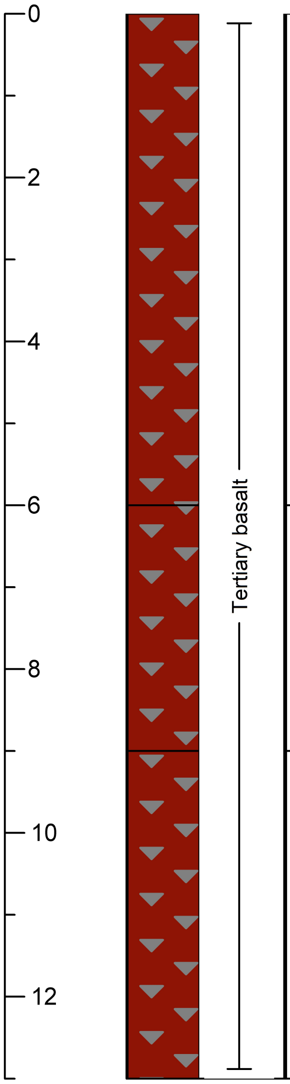
Client: Snowy Hydro Ltd
Project: Snowy Hydro 2.0

Date completed: 29/05/2019
Drilling contractor: Highland Drilling
Drilling method: Air Rotary
Hydrogeologist: C Corthier

Project number: J17188
Elevation (mAHD): 821 m AHD
Easting: 692962
Northing: 5987797

Static Water Level (mBGL): 6.69 m bgl
Total depth (mBGL): 12.5 m
Open Formation: Tertiary Basalt
Open Depth (mBGL): 5 - 11 m
Date: 06/06/2019
Casing: 50 mm PVC

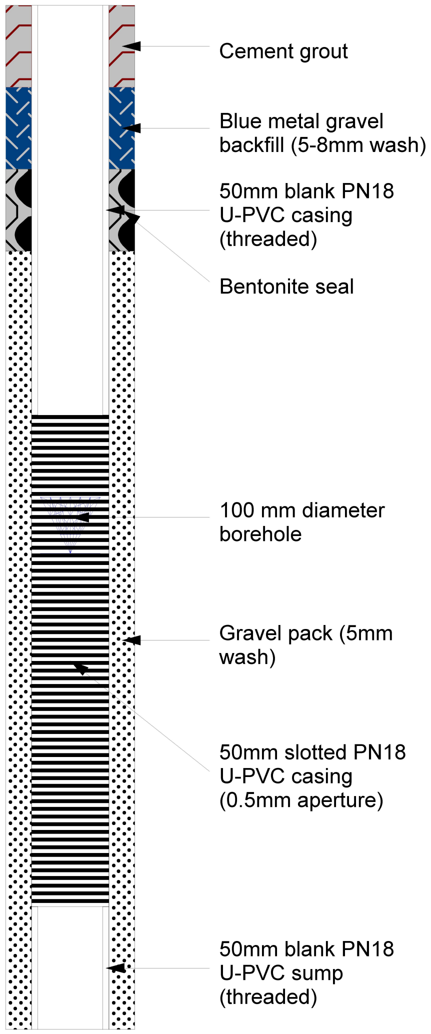
Depth (mBGL) | **Lithology Graphic**



Description	**Water Quality**
BASALT, reddish grey, highly weathered, oxidised, dry	
BASALT, silty, dark grey, moderately weathered, dry	
BASALT, greyish black, slightly weathered to fresh, possibly fractured, trace olivine. Minor QUARTZ, light grey, very coarse-grained, angular. Wet	Water Cut: 0.1 L/s, T: 12.2?C, EC: 688 µS/cm, pH: 8.2

Bore Completion

Diagram | **Design notes**



NSW GOVERNMENT Office of Water

Form A Particulars of completed work

Page 1

1

Driller's Licence No: DL1913
Class of Licence: Class 4
Driller's Name: Ian Palk
Assistant Driller: Calum Roach
Contractor: Highland Drilling

New bore	☒	Replacement bore	☐
Deepened	☐	Enlarged	☐
Reconditioned	☐	Other (specify)	☐

Final Depth 18 m

2

Work Licence No: MB06
Name of Licensee: Snowy Hydro Ltd
Intended Use: Monitoring Bore
Completion Date: 29/5/19

DRILLING DETAILS 3

From (m)	To (m)	Hole Diameter (mm)	Drilling Method See Code 3
0	1.5	114	5
1.5	18	114	9

WATER BEARING ZONES 4

From (m)	To (m)	Thickness (m)	S W L (m)	Estimated Yield (L/s) Individual Aquifer	Estimated Yield (L/s) Cumulative	Test method See Code 4		D D L at end of test (m)	Duration Hrs	Duration min	Salinity (Conductivity or TDS) Cond (µS/cm)	Salinity (Conductivity or TDS) TDS (mg/L)
16	17	1	8.22	<0.1	<0.1	1	A				424	

CASING / LINER DETAILS 5

Material Code 5	OD (mm)	Wall Thickness (mm)	From (m)	To (m)	Method Fixing Code 5
8	60.2	5	0	11	5
8	60.2	5	17	18	5

Casing support method See Code 5: 3
Type of casing bottom See Code 5: 2
Centralisers installed {Yes/No} No (indicate on sketch)
Sump installed {Yes/No} Yes From 17 m To 18 m
Pressure cemented {Yes/No} No From m To m
Casing Protector cemented in place

WATER ENTRY DESIGN 6

General							Screen	Slot Details		
Material Code 5	OD (mm)	Wall Thickness (mm)	From (m)	To (m)	Opening type See Code 6	Fixing See Code 5	Aperture (mm)	Length (mm)	Width (mm)	Alignment See Code 6
8	60.2	5			5	5	0.4	20	10	H

GRAVEL PACK 7

Type		Grade		Grain size (mm) From	Grain size (mm) To	Depth (m) From	Depth (m) To	Quantity Litres	Quantity m³
Rounded	☒	Graded	☒	3	5	8	18		
Crushed	☐	Ungraded	☐						
Bentonite/Grout seal		(Yes/No)	Yes			7	8		

Method of placement of Gravel Pack See Code 7: 1

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NSW GOVERNMENT Office of Water

Form A Particulars of completed work

Page 2

Work Licence No: MB06

BORE DEVELOPMENT 8

Chemical used for breaking down drilling mud (Yes/No) No Name:

Method	Bailing/Surging ☐	Jetting ☐	Airlifting ☒	Backwashing ☐	Pumping ☐	Other:
Duration	hrs	hrs	0.5 hrs	hrs	hrs	hrs

DISINFECTION ON COMPLETION 9

Chemical(s) used	Quantity applied (Litres)	Method of application

PUMPING TESTS ON COMPLETION 10

Test type		Date	Pump intake depth (m)	Initial Water Level (SWL) (m)	Pumping rate (L/s)	Water Level at end of pumping (DDL) (m)	Duration of Test (hrs)	Recovery		
								Water level (m)	Time taken (hrs)	(mins)
Multi stage (stepped drawdown)	Stage 1									
	Stage 2									
	Stage 3									
	Stage 4									
Single stage (constant rate)										

Height of measuring point above ground level ____ m Test Method ____ See Code 4

WORK PARTLY BACKFILLED OR ABANDONED 11

Original depth of work: ____ m Is work partly backfilled: (Yes/No) Yes

Is work abandoned: (Yes/No) ____ Method of abandonment: Backfilled ☒ Plugged ☐ Capped ☐

Has any casing been left in the work (Yes/No) ____ From ____ m To ____ m

Sealing / fill type See Code 11	From depth (m)	To depth (m)	Sealing / fill type See Code 11	From depth (m)	To depth (m)

Site chosen by: Hydrogeologist ☐ Geologist ☐ Driller ☐ Diviner ☐ Client ☐ Other ____ 12

13

Lot No 14 DP No 250029

Work Location Co ordinates Easting 692897 Northing 5987581 Zone 55

GPS: (Yes/No) Yes >> AMG/AGD ☐ or MGA/GDA ☒ (See explanation)

Please mark the work site with "X" on the CLID provided map.

Indicate also the distances in metres from two (2) adjacent boundaries, and attach the map to this Form A package.

Signatures:

Driller: -- **Licensee:** --

Date: 26/07/2019 **Date:** --

Form A Particulars of completed work

Page 3

Work Licence No: MB06

DRILLER'S ROCK/STRATA DESCRIPTION (LITHOLOGY)

Depth		Description
From (m)	To (m)	See Code 15
		Please see attached log

15 WORK CONSTRUCTION SKETCH

WORK NOT CONSTRUCTED BY DRILLING RIG

16

Method of excavation: Hand dug ☐ Back hoe ☐ Dragline ☐ Dozer ☐ Other

Depth (m)	Length (m)	Width (m)	Diameter (m)	Lining material	Dimentions of liner (m)	From Depth (m)	To Depth (m)

Please attach copies of the following if available

17

Geologist log (Yes/No) Yes

Laboratory analysis of water Sample (Yes/No)

Pumping test(s) (Yes/No)

Geophysical log (Yes/No)

Sieve analysis of aquifer material (Yes/No)

Installed Pump details (Yes/No)

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WATER MONITORING BORE LOG

Bore ID: MB06

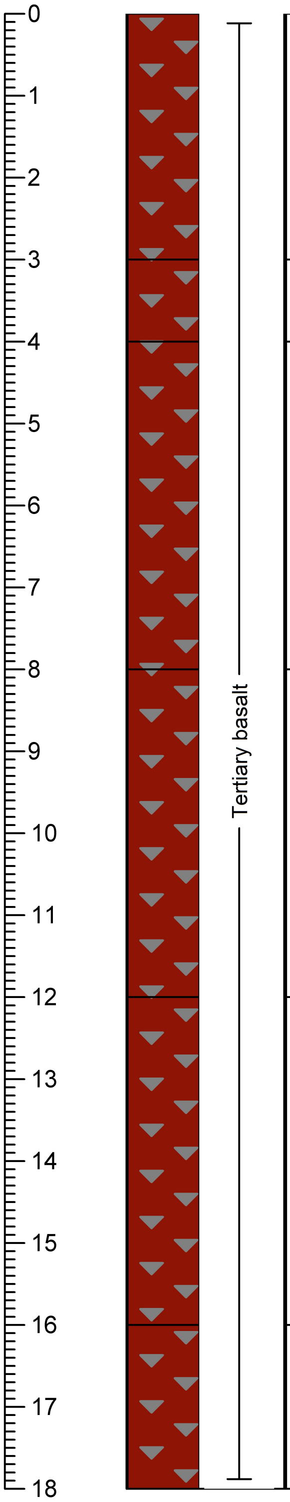
Client: Snowy Hydro Ltd
Project: Snowy Hydro 2.0

Date completed: 29/05/2019
Drilling contractor: Highland Drilling
Drilling method: Air Rotary
Hydrogeologist: C Corthier

Project number: J17188
Elevation (mAHD): 822.3 m AHD
Easting: 692897
Northing: 5987581

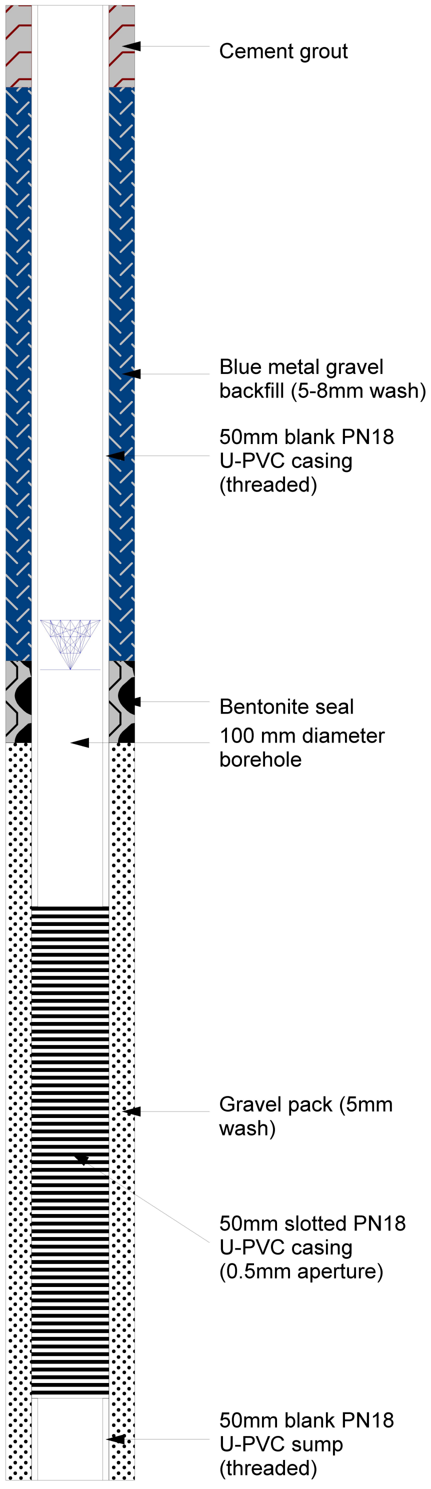
Static Water Level (mBGL): 8.22 m bgl
Total depth (mBGL): 18 m
Open Formation: Tertiary Basalt
Open Depth (mBGL): 11 - 17 m
Date: 06/06/2019
Casing: 50 mm PVC

Depth (mBGL)	Lithology Graphic	Description	Water Quality
0		BASALT, slightly clayey, brownish grey, fine-grained, moderately weathered, trace oxidation	
3		BASALT, clayey, fine-grained, brownish grey, highly weathered	
4		BASALT, dark grey, fine-grained, slightly weathered to fresh, possibly fractured, trace light grey, very coarse-grained, angular quartz	
8		BASALT, dark bluish grey, fine-grained, fresh, very hard, minor olivine	
12		BASALT, bluish grey, fine-grained, slightly weathered	
16		BASALT, clayey, dark grey, fine-grained, highly weathered, minor oxidation	Water Cut: <0.1 L/s, T: 15.9?C, EC: 424 μS/cm, pH: 7.8



Bore Completion

Diagram	Design notes



Attachment B

Geological construction bore logs

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WATER MONITORING BORE LOG

Bore ID: MB01

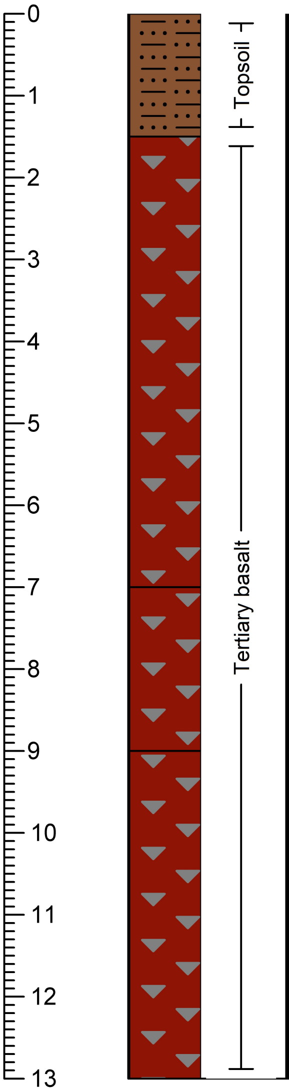
Client: Default Listing
Project: Snowy Hydro 2.0

Date completed: 27/05/2019
Drilling contractor: Highland Drilling
Drilling method: Default Listing
Hydrogeologist: C Corthier

Project number: J17188
Elevation: 820 m AHD
Easting: 693090
Northing: 5988456

Static Water Level: 6.05 m bgl
Total depth: 13 m
Screened Formation: Tertiary Basalt
Screened depth: 5 - 11 m
Date: 06/06/2019
Casing: 50 mm PVC

Depth (mbgl)	**Lithology Graphic**	**Description**	**Drilling Notes**	**Bore Completion**	
				Diagram	**Design notes**



TOPSOIL, brown, unconsolidated, clay

BASALT, dark grey, fine-grained, fresh, dry

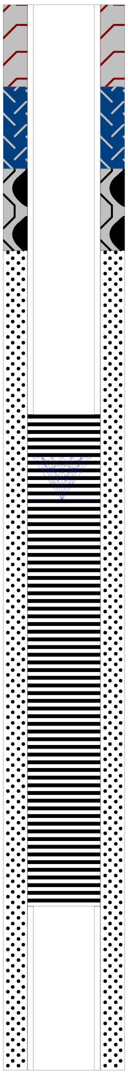
BASALT, dark grey, fine-grained, highly weathered, damp

Minor QUARTZ, light grey, very coarse-grained, sub-angular

BASALT, dark grey, fine-grained, moderately to highly weathered, wet

Minor QUARTZ, light grey, very coarse grained, sub-angular

Water Cut: 0.2 L/s, T: 13.1°C, EC: 1056 µS/cm, pH: 8.0



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WATER MONITORING BORE LOG

Bore ID: MB02

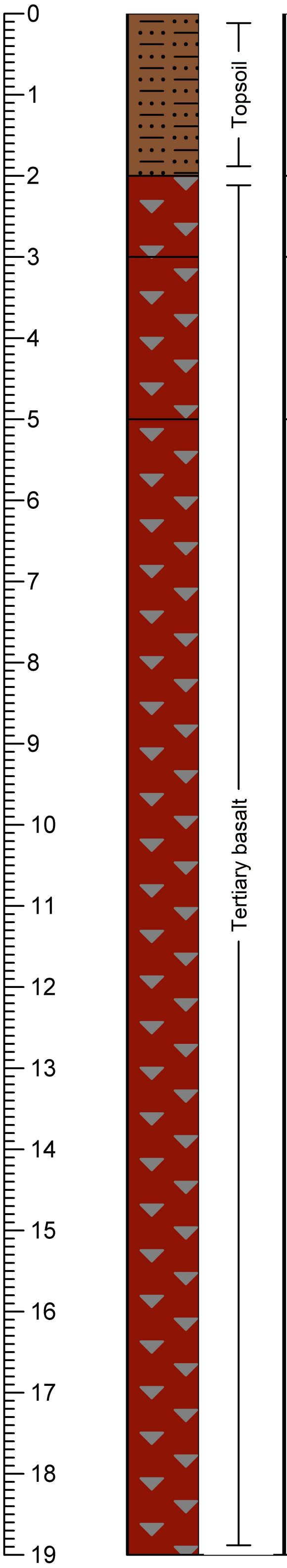
Client: Default Listing
Project: Snowy Hydro 2.0

Date completed: 28/05/2019
Drilling contractor: Highland Drilling
Drilling method: Default Listing
Hydrogeologist: C Corthier

Project number: J17188
Elevation: 823.8 m AHD
Easting: 693354
Northing: 5988363

Static Water Level: 9.76 m bgl
Total depth: 19 m
Screened Formation: Tertiary Basalt
Screened depth: 12 - 18 m
Date: 06/06/2019
Casing: 50 mm PVC

Depth (mbgl)	**Lithology Graphic**	**Description**	**Drilling Notes**	**Bore Completion**	
				Diagram	**Design notes**



TOPSOIL, brown, unconsolidated, clay

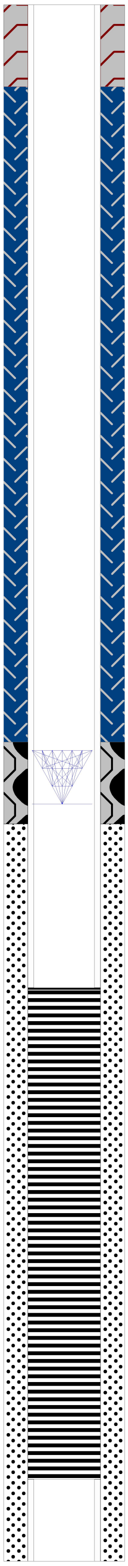
BASALT, dark bluish grey, fine-grained, fresh, dry

BASALT, bluish grey, fine-grained, slightly to moderately weathered, dry

Trace QUARTZ, very light grey, coarse grained, angular

BASALT, dark bluish grey, fine-grained, fresh, possibly minor fractures at 10m, damp

Water Cut: 0.1 L/s, T: 9.8^{o}C, EC: 318 µS/cm, pH: 9.6



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WATER MONITORING BORE LOG

Bore ID: MB03

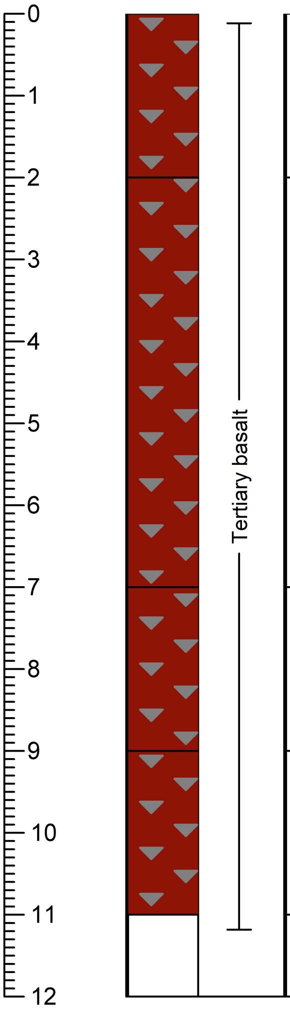
Client: Snowy Hydro Ltd **Project:** Snowy Hydro 2.0

Date completed: 29/05/2019
Drilling contractor: Highland Drilling
Drilling method: Air Rotary
Hydrogeologist: C Corthier

Project number: J17188
Elevation (mAHD): 818.9 m AHD
Easting: 693004
Northing: 5988195

Static Water Level (mBGL): 4.96 m bgl
Total depth (mBGL): 11 m
Open Formation: Tertiary Basalt
Open Depth (mBGL): 3.5 - 9.5 m
Date: 06/06/2019
Casing: 50 mm PVC

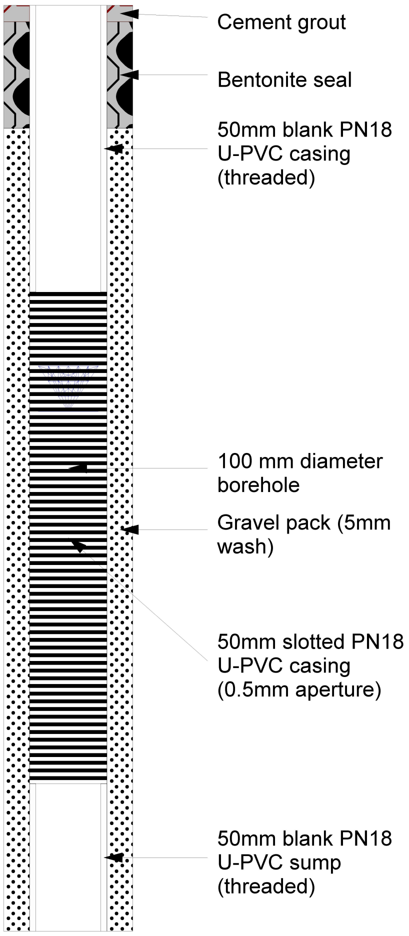
Depth (mBGL) | **Lithology Graphic**



Description	**Water Quality**
BASALT, dark grey, fine-grained, slightly weathered to fresh, dry	
BASALT, clayey, medium grey, fine-grained, moderately to highly weathered, dry Minor QUARTZ, very light grey, very coarse-grained, angular	Water Cut: 0.1 L/s, T: 12.0°C, EC: 649 µS/cm, pH: 8.6
BASALT, clayey, medium grey, fine-grained, moderately to highly weathered, minor oxidation, wet	
BASALT, greyish black, fine-grained, fresh, minor oxidation, wet Trace QUARTZ, white, very coarse-grained, angular	

Bore Completion

Diagram | **Design notes**



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WATER MONITORING BORE LOG

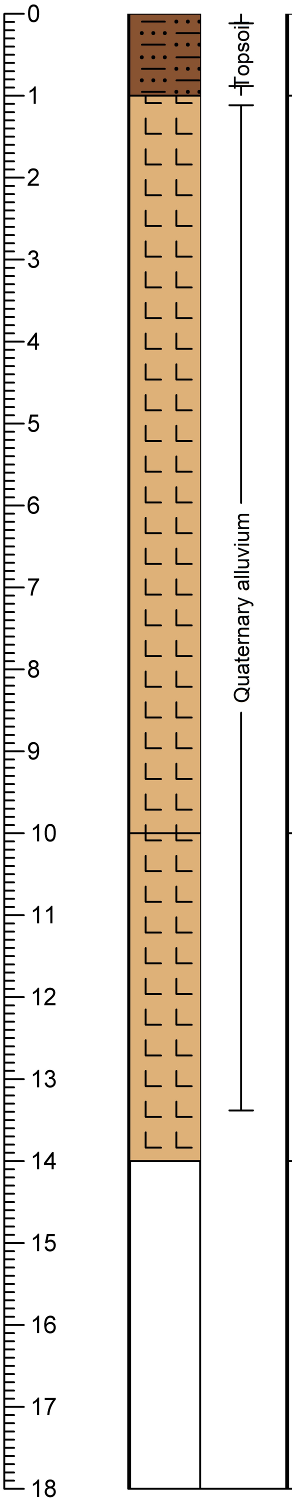
Bore ID: MB04A

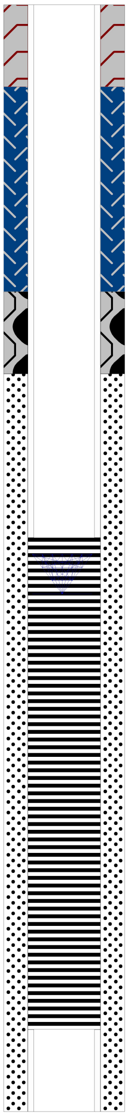
Client: Default Listing
Project: Snowy Hydro 2.0

Date completed:	28/05/2019	**Project number:**	J17188
Drilling contractor:	Highland Drilling	**Elevation:**	825.4 m AHD
Drilling method:	Default Listing	**Easting:**	693394
Hydrogeologist:	C Corthier	**Northing:**	5988023

Static Water Level:	6.60 m bgl	**Screened Formation:**	Quaternary Alluvium	**Date:**	06/06/2019
Total depth:	13.5 m	**Screened depth:**	6.5 - 12.5 m	**Casing:**	50 mm PVC

Depth (mbgl)	Lithology Graphic	Description	Drilling Notes	Bore Completion Diagram	Bore Completion Design notes
		TOPSOIL, brown, unconsolidated clay			
		SILTY CLAY, yellowish orange, unconsolidated, dry			
		SILTY CLAY, brownish orange, locally red, unconsolidated, wet	Water Cut: <0.1 L/s		





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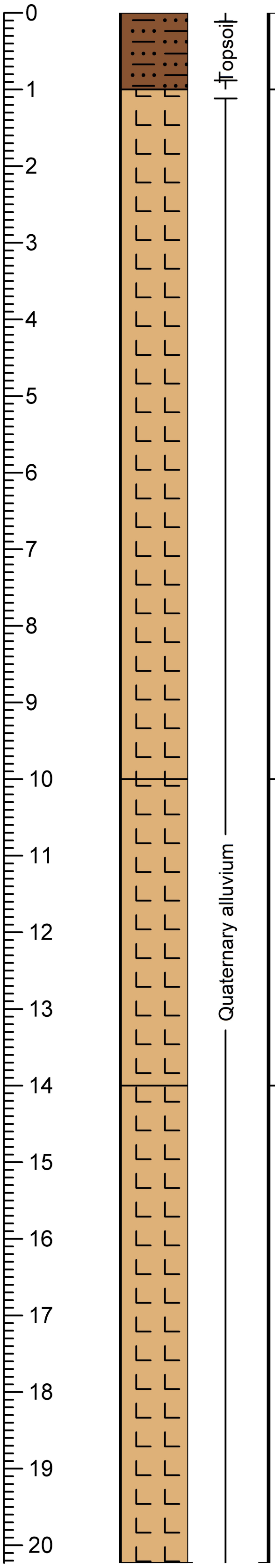
WATER MONITORING BORE LOG

Bore ID: MB04B

Client: Default Listing
Project: Snowy Hydro 2.0
Date completed: 30/05/2019
Drilling contractor: Highland Drilling
Drilling method: Default Listing
Hydrogeologist: C Corthier
Project number: J17188
Elevation: 825.3 m AHD
Easting: 693391
Northing: 5988024
Static Water Level: 8.67 m bgl
Total depth: 30 m
Screened Formation: Tertiary Basalt
Screened depth: 23 - 29 m
Date: 06/06/2019
Casing: 50 mm PVC

Depth (mbgl)	Lithology Graphic	Description	Drilling Notes	Bore Completion: Diagram	Bore Completion: Design notes

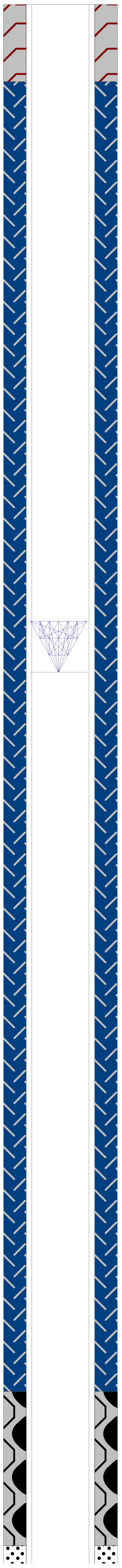


TOPSOIL, brown, unconsolidated clay

SILTY CLAY, yellowish orange, unconsolidated, dry

SANDY CLAYEY SILT, reddish orange, weakly consolidated, dry

SANDY CLAYEY SILT, yellowish orange, weakly consolidated, damp



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WATER MONITORING BORE LOG

Bore ID: MB04B

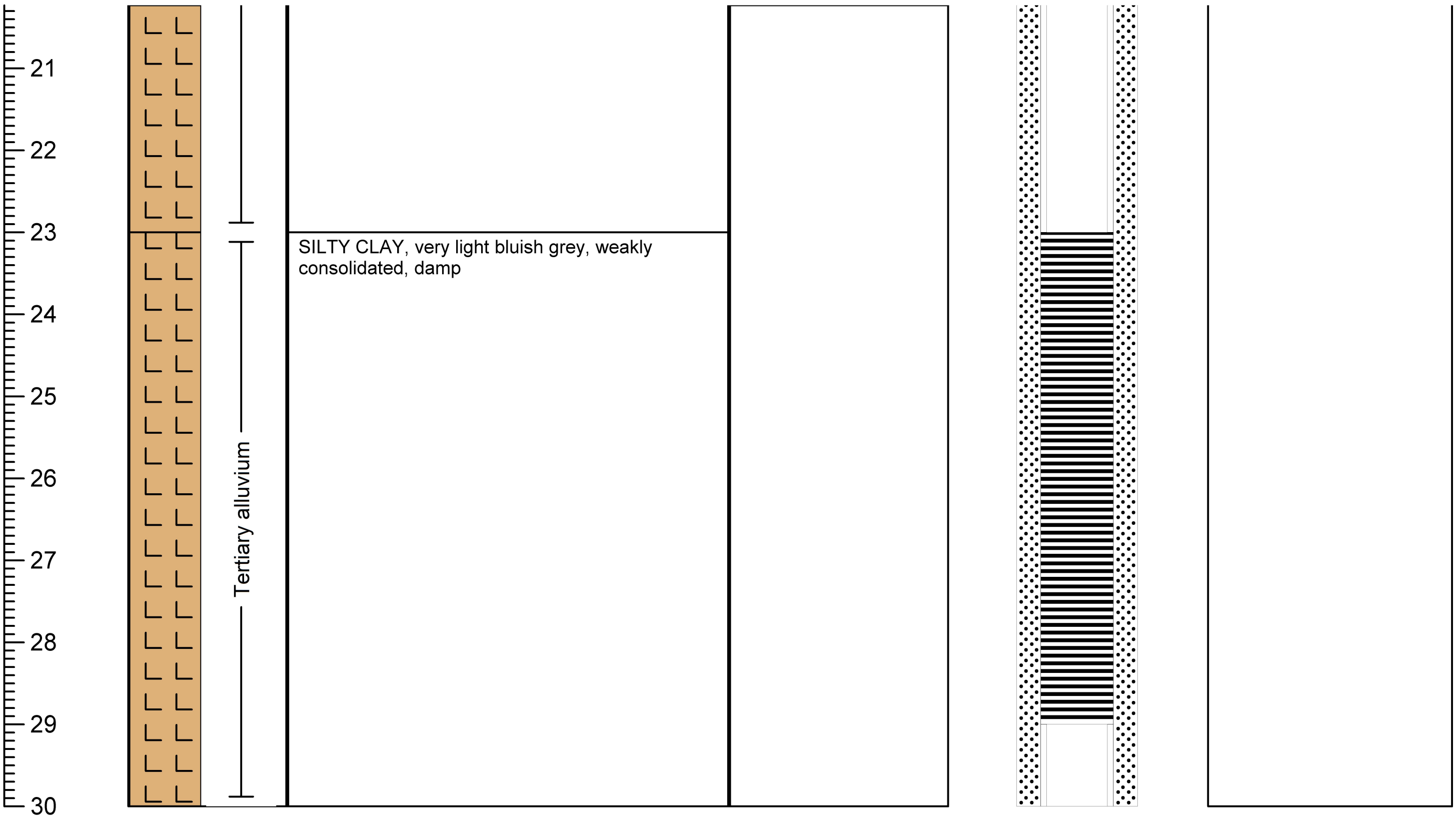
Client: Default Listing
Project: Snowy Hydro 2.0

Date completed: 30/05/2019
Drilling contractor: Highland Drilling
Drilling method: Default Listing
Hydrogeologist: C Corthier

Project number: J17188
Elevation: 825.3 m AHD
Easting: 693391
Northing: 5988024

Static Water Level: 8.67 m bgl
Total depth: 30 m
Screened Formation: Tertiary Basalt
Screened depth: 23 - 29 m
Date: 06/06/2019
Casing: 50 mm PVC

Depth (mbgl)	Lithology Graphic	Description	Drilling Notes	Bore Completion Diagram	Bore Completion Design notes



SILTY CLAY, very light bluish grey, weakly consolidated, damp

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WATER MONITORING BORE LOG

Bore ID: MB05

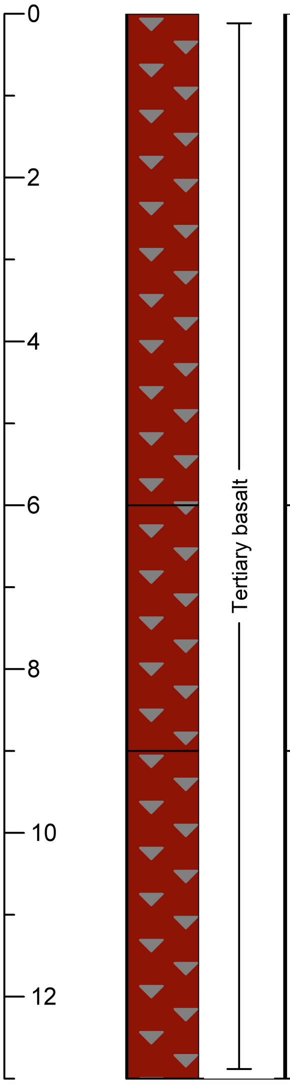
Client: Snowy Hydro Ltd
Project: Snowy Hydro 2.0

Date completed: 29/05/2019
Drilling contractor: Highland Drilling
Drilling method: Air Rotary
Hydrogeologist: C Corthier

Project number: J17188
Elevation (mAHD): 821 m AHD
Easting: 692962
Northing: 5987797

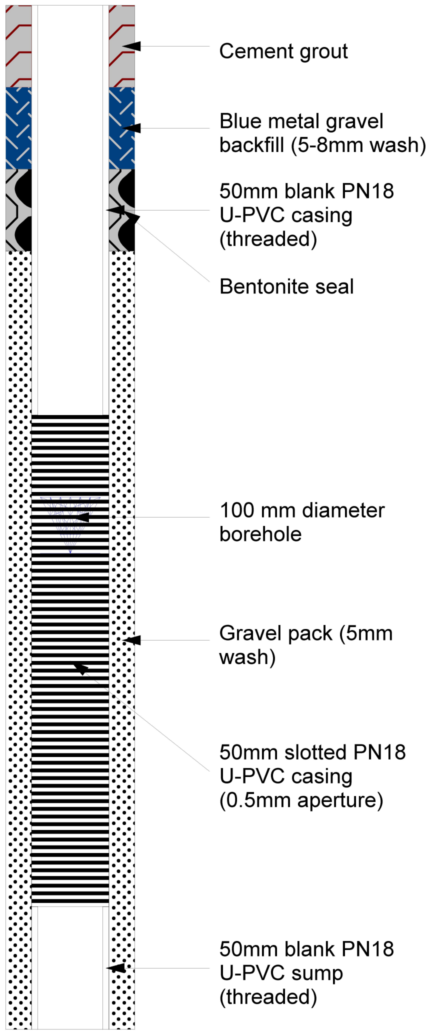
Static Water Level (mBGL): 6.69 m bgl
Total depth (mBGL): 12.5 m
Open Formation: Tertiary Basalt
Open Depth (mBGL): 5 - 11 m
Date: 06/06/2019
Casing: 50 mm PVC

Depth (mBGL)	Lithology Graphic	Description	Water Quality
0	Tertiary basalt	BASALT, reddish grey, highly weathered, oxidised, dry	
		BASALT, silty, dark grey, moderately weathered, dry	
		BASALT, greyish black, slightly weathered to fresh, possibly fractured, trace olivine. Minor QUARTZ, light grey, very coarse-grained, angular. Wet	Water Cut: 0.1 L/s, T: 12.2?C, EC: 688 µS/cm, pH: 8.2



Bore Completion

Diagram | Design notes



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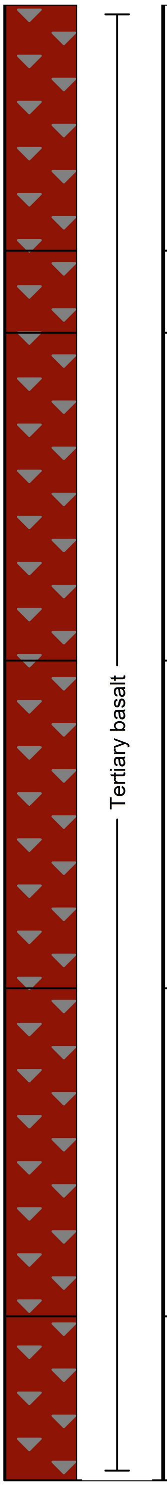
WATER MONITORING BORE LOG

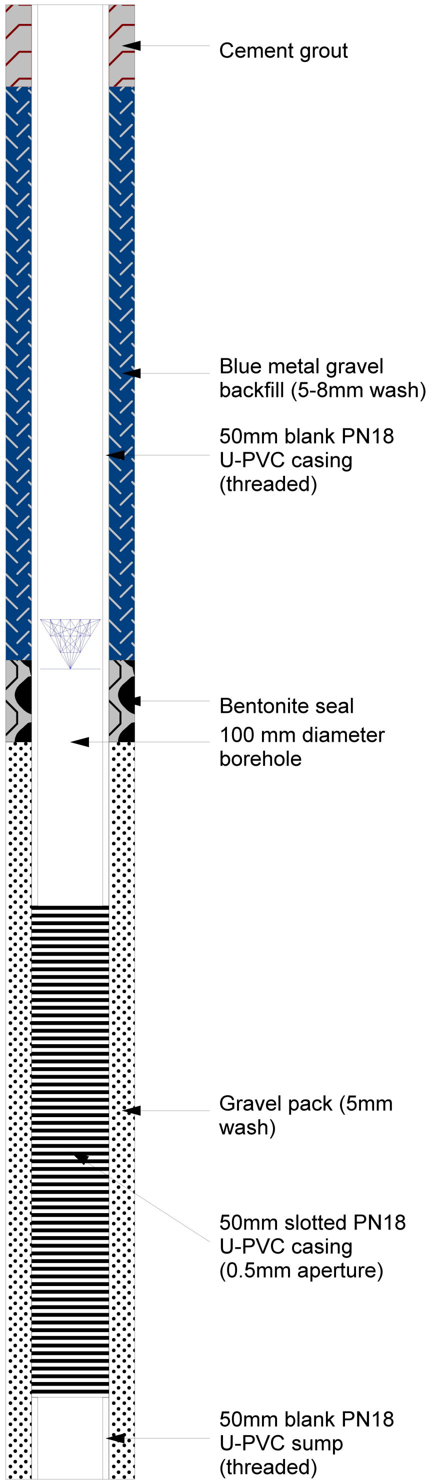
Bore ID: MB06

Client: Snowy Hydro Ltd
Project: Snowy Hydro 2.0
Date completed: 29/05/2019
Drilling contractor: Highland Drilling
Drilling method: Air Rotary
Hydrogeologist: C Corthier
Project number: J17188
Elevation (mAHD): 822.3 m AHD
Easting: 692897
Northing: 5987581
Static Water Level (mBGL): 8.22 m bgl
Total depth (mBGL): 18 m
Open Formation: Tertiary Basalt
Open Depth (mBGL): 11 - 17 m
Date: 06/06/2019
Casing: 50 mm PVC



Depth (mBGL)	Description	Water Quality
0 - 3	BASALT, slightly clayey, brownish grey, fine-grained, moderately weathered, trace oxidation	
3 - 4	BASALT, clayey, fine-grained, brownish grey, highly weathered	
4 - 8	BASALT, dark grey, fine-grained, slightly weathered to fresh, possibly fractured, trace light grey, very coarse-grained, angular quartz	
8 - 12	BASALT, dark bluish grey, fine-grained, fresh, very hard, minor olivine	
12 - 16	BASALT, bluish grey, fine-grained, slightly weathered	
16 - 18	BASALT, clayey, dark grey, fine-grained, highly weathered, minor oxidation	Water Cut: <0.1 L/s, T: 15.9?C, EC: 424 µS/cm, pH: 7.8

Bore Completion



Annexure C

Soil borelogs

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SOIL SAMPLING BOREHOLE S01

PROJECT NUMBER J17188
PROJECT NAME Snowy Hydro 2.0
CLIENT Snowy Hydro Limited
ADDRESS Polo Flats Airstrip
LICENCE NO.

DRILLING DATE 17/04/19
TOTAL DEPTH 0.1m
DIAMETER N/A
PID Mini RAE

LOCATION Adjacent Buildings
WEATHER Sunny
SURFACE COND. Grassed

COMMENTS

LOGGED BY AR + AHJ of Robson Environmental
CHECKED BY

Drilling Method	Depth (m)	Sample ID	PID	Graphic Log	Material Description	Moisture	Consistency	Additional Observations
SHOVEL	0.05	S01_0-0.1	0.5	▥	CLAYEY SILT, BROWN, DRY, SOFT, ROOTLETS	D		Top Soil
	0.1				End of BH @ 0.1m			TARGET @ 0.1m REACHED
	0.15							
	0.2							
	0.25							
	0.3							
	0.35							
	0.4							
	0.45							
	0.5							
	0.55							
	0.6							
	0.65							
	0.7							
	0.75							
	0.8							
	0.85							
	0.9							
	0.95							

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SOIL SAMPLING BOREHOLE S02

PROJECT NUMBER J17188
PROJECT NAME Snowy Hydro 2.0
CLIENT Snowy Hydro Limited
ADDRESS Polo Flats Airstrip
LICENCE NO.

DRILLING DATE 17/04/19
TOTAL DEPTH 0.5m
DIAMETER N/A
PID Mini RAE

LOCATION Adjacent Buildings
WEATHER Sunny
SURFACE COND. Grass Cover

COMMENTS

LOGGED BY AR + AHJ of Robson Environmental
CHECKED BY

Drilling Method	Depth (m)	Sample ID	PID	Graphic Log	Material Description	Moisture	Consistency	Additional Observations
Shovel	0.05 0.1	S02_0-0.1	0.1	▥	CLAYEY SILT, BROWN, DRY, ROOTLETS, SOFT	Dry	Loose	Top Soil
Hand Auger	0.15 0.2 0.25 0.3			⁘	Gavelly Silt, Dry, Soft			Fill
	0.35 0.4 0.45 0.5	S02_0.4-0.5	0.8	▨	Clay, with Gravel, Dark Brown, Moist, High Plasticity	Moist		Reworked Natural
	0.55 0.6 0.65 0.7 0.75 0.8 0.85 0.9 0.95				End of BH @ 0.5m			Target @0.5m Reached

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SOIL SAMPLING BOREHOLE S03

PROJECT NUMBER J17188
PROJECT NAME Snowy Hydro 2.0
CLIENT Snowy Hydro Limited
ADDRESS Polo Flats Airstrip
LICENCE NO.

DRILLING DATE 17/04/19
TOTAL DEPTH 0.1m
DIAMETER N/A
PID Mini RAE

LOCATION Adjacent Buildings
WEATHER Fine
SURFACE COND. Grass Cover

COMMENTS

LOGGED BY AHJ of Robson Environmental
CHECKED BY

Drilling Method	Depth (m)	Sample ID	PID	Graphic Log	Material Description	Moisture	Consistency	Additional Observations
Shovel	0.05 0.1	S03_0-0.1	0.3	▨	Gravelley Silt Hard, Brown, Low Plasticity	Dry		Fill
	0.15 0.2 0.25 0.3 0.35 0.4 0.45 0.5 0.55 0.6 0.65 0.7 0.75 0.8 0.85 0.9 0.95				END of BH S03 @0.1m			Target Depth Reached @ 0.1

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SOIL SAMPLING BOREHOLE S04

PROJECT NUMBER J17188
PROJECT NAME Snowy Hydro 2.0
CLIENT Snowy Hydro Limited
ADDRESS Polo Flats Airstrip
LICENCE NO.

DRILLING DATE 17/04/19
TOTAL DEPTH 0.5m
DIAMETER N/A
PID Mini RAE

LOCATION Adjacent Buildings
WEATHER Sunny
SURFACE COND. Grass Cover

COMMENTS

LOGGED BY AR + AHJ of Robson Environmental
CHECKED BY

Drilling Method	Depth (m)	Sample ID	PID	Graphic Log	Material Description	Moisture	Consistency	Additional Observations
Shovel		S04_0-0.1			CLAYEY SILT, BROWN, MOD PLASTICITY	Moist	Soft	Reworked Fill
Hand Auger	0.05		0.3					
	0.1							
	0.15							
	0.2							
	0.25							
	0.3							
	0.35							
	0.4	S04_0.4-0.5						
	0.45		0.2					
	0.5				End of BH @ 0.5m			Target @ 0.5m Depth
	0.55							
	0.6							
	0.65							
	0.7							
	0.75							
	0.8							
	0.85							
	0.9							
	0.95							

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SOIL SAMPLING BOREHOLE S05

PROJECT NUMBER J17188
PROJECT NAME Snowy Hydro 2.0
CLIENT Snowy Hydro Limited
ADDRESS Polo Flats Airstrip
LICENCE NO.

DRILLING DATE 17/04/19
TOTAL DEPTH 0.5m
DIAMETER N/A
PID Mini RAE

LOCATION Adjacent Buildings
WEATHER Fine
SURFACE COND. Grassed Cover

COMMENTS

LOGGED BY AHJ of Robson Environmental
CHECKED BY

Drilling Method	Depth (m)	Sample ID	PID	Graphic Log	Material Description	Moisture	Consistency	Additional Observations
Shovel		S05_0-0.1 QC01 QC02			CLAYEY SILT, DARK BROWN, ORGANIC MATTER MOD PLAST	Moist		Top Soil
Hand Auger	0.05		0.6					
	0.1							
	0.15							
	0.2							
	0.25							
	0.3				Clay, Dark Brown, Moist, High Plasticity		Firm	Natural
	0.35							
	0.4	S05_0.4-0.5						
	0.45		0.1					
	0.5				End of BH S05 @ 0.5m			Target @0.5m Reached
	0.55							
	0.6							
	0.65							
	0.7							
	0.75							
	0.8							
	0.85							
	0.9							
	0.95							

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SOIL SAMPLING BOREHOLE S06

PROJECT NUMBER J17188	**DRILLING DATE** 17/04/19	**LOCATION** Adjacent Buildings
PROJECT NAME Snowy Hydro 2.0	**TOTAL DEPTH** 0.5m	**WEATHER** Sunny
CLIENT Snowy Hydro Limited	**DIAMETER** N/A	**SURFACE COND.** Grass Cover
ADDRESS Polo Flats Airstrip	**PID** Mini RAE	
LICENCE NO.		

COMMENTS

LOGGED BY AR + AHJ of Robson Environmental
CHECKED BY

Drilling Method	Depth (m)	Sample ID	PID	Graphic Log	Material Description	Moisture	Consistency	Additional Observations
Shovel		S06_0-0.1			FILL - CLAYEY SILT, BROWN, ROOTLETS	Dry	Loose	Reworked Natural
	0.05		1.0					
Hand Auger	0.1							
	0.15							
	0.2							
	0.25							
	0.3							
	0.35							
	0.4	S06_0.4-0.5			Silty, Clayey, GRAVEL, Yellow/Brown, Hard with silt stone Gravel	Moist	Hard	
	0.45		0.9					
	0.5				End of BH @ 0.5m			Target @ 0.5m Depth
	0.55							
	0.6							
	0.65							
	0.7							
	0.75							
	0.8							
	0.85							
	0.9							
	0.95							

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SOIL SAMPLING BOREHOLE S07

PROJECT NUMBER J17188
PROJECT NAME Snowy Hydro 2.0
CLIENT Snowy Hydro Limited
ADDRESS Polo Flats Airstrip
LICENCE NO.

DRILLING DATE 17/04/19
TOTAL DEPTH 0.1m
DIAMETER N/A
PID Mini RAE

LOCATION Adjacent Buildings
WEATHER Fine
SURFACE COND. Grass Cover

COMMENTS

LOGGED BY AHJ of Robson Environmental
CHECKED BY

Drilling Method	Depth (m)	Sample ID	PID	Graphic Log	Material Description	Moisture	Consistency	Additional Observations
Shovel	0.05	S07_0-0.1	0.7	▥	Fill - Clayey Silt, Brown with Rootlets	Dry	Loose	Reworked Natural
	0.1 0.15 0.2 0.25 0.3 0.35 0.4 0.45 0.5 0.55 0.6 0.65 0.7 0.75 0.8 0.85 0.9 0.95				END of BH S07 @0.1m			Target Depth Reached @ 0.1

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SOIL SAMPLING BOREHOLE S08

PROJECT NUMBER J17188
PROJECT NAME Snowy Hydro 2.0
CLIENT Snowy Hydro Limited
ADDRESS Polo Flats Airstrip
LICENCE NO.

DRILLING DATE 17/04/19
TOTAL DEPTH 0.3m
DIAMETER N/A
PID Mini RAE

LOCATION East of Building
WEATHER Fine
SURFACE COND. Grass Cover

COMMENTS

LOGGED BY AHJ of Robson Environmental
CHECKED BY

Drilling Method	Depth (m)	Sample ID	PID	Graphic Log	Material Description	Moisture	Consistency	Additional Observations
Shovel	0.05	S08_0-0.1	0.4	▥	CLAYEY SILT, BROWN, DRY, ROOTLETS, MOD PLASTICITY	Dry	Loose	Top Soil
Hand Auger	0.1 0.15 0.2 0.25	S08_0.3 - 0.4		⁘	Gavelly Silt, Dry, Loose, Brown			Fill
	0.3 0.35 0.4 0.45 0.5 0.55 0.6 0.65 0.7 0.75 0.8 0.85 0.9 0.95		0.2		End of BH S08@ 0.3m			Refusal @ 0.3m (Boulder)

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SOIL SAMPLING BOREHOLE S09

PROJECT NUMBER J17188
PROJECT NAME Snowy Hydro 2.0
CLIENT Snowy Hydro Limited
ADDRESS Polo Flats Airstrip
LICENCE NO.

DRILLING DATE 17/04/19
TOTAL DEPTH 0.1m
DIAMETER N/A
PID Mini RAE

LOCATION East of Building
WEATHER Fine
SURFACE COND.

COMMENTS

LOGGED BY AHJ of Robson Environmental
CHECKED BY

Drilling Method	Depth (m)	Sample ID	PID	Graphic Log	Material Description	Moisture	Consistency	Additional Observations
SHOVEL	0.05	S09_0-0.1	0.3	▥	CLAYEY SILT, BROWN, DRY, SOFT, ROOTLETS, MOD PLASTICITY	Dry		Top Soil
	0.1 0.15 0.2 0.25 0.3 0.35 0.4 0.45 0.5 0.55 0.6 0.65 0.7 0.75 0.8 0.85 0.9 0.95				End of BH S09@ 0.1m			TARGET @ 0.1m REACHED

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SOIL SAMPLING BOREHOLE S10

PROJECT NUMBER J17188
PROJECT NAME Snowy Hydro 2.0
CLIENT Snowy Hydro Limited
ADDRESS Polo Flats Airstrip
LICENCE NO.

DRILLING DATE 17/04/19
TOTAL DEPTH 0.1m
DIAMETER N/A
PID Mini RAE

LOCATION West of Building
WEATHER Fine
SURFACE COND. Grassed Cover

COMMENTS

LOGGED BY AHJ of Robson Environmental
CHECKED BY

Drilling Method	Depth (m)	Sample ID	PID	Graphic Log	Material Description	Moisture	Consistency	Additional Observations
SHOVEL	0.05	S10_0-0.1	0.9	▥	CLAYEY SILT, DRY, HARD, ROOTLETS, MOD PLASTICITY	Dry	Hard	Top Soil
	0.1 0.15 0.2 0.25 0.3 0.35 0.4 0.45 0.5 0.55 0.6 0.65 0.7 0.75 0.8 0.85 0.9 0.95				End of BH S10@ 0.1m			TARGET @ 0.1m REACHED

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SOIL SAMPLING BOREHOLE S11

PROJECT NUMBER J17188
PROJECT NAME Snowy Hydro 2.0
CLIENT Snowy Hydro Limited
ADDRESS Polo Flats Airstrip
LICENCE NO.

DRILLING DATE 17/04/19
TOTAL DEPTH 0.5m
DIAMETER N/A
PID Mini RAE

LOCATION Adjacent Buildings
WEATHER Sunny
SURFACE COND. Grass Cover

COMMENTS

LOGGED BY AR + AHJ of Robson Environmental
CHECKED BY

Drilling Method	Depth (m)	Sample ID	PID	Graphic Log	Material Description	Moisture	Consistency	Additional Observations
Shovel	0.05	S11_0-0.1	0.3		FILL - CLAYEY SILT, BROWN, ROOTLETS, ORGANIC MATTER	Moist	Loose	Reworked Natural Soils
Hand Auger	0.1 0.15 0.2 0.25 0.3 0.35				Silty, Clayey, GRAVEL, Fine to medium grade, Yellow/Brown, Hard with silt stone cobbles	Dry	Comp	
	0.4 0.45	S11_0.4-0.5	0.1		Silty Clay, High Plasticity, Brown With Some Siltstone Gravel	Moist	Firm	
	0.5 0.55 0.6 0.65 0.7 0.75 0.8 0.85 0.9 0.95				End of BH S11 @ 0.5m			Target @ 0.5m Depth

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SOIL SAMPLING BOREHOLE S12

PROJECT NUMBER J17188
PROJECT NAME Snowy Hydro 2.0
CLIENT Snowy Hydro Limited
ADDRESS Polo Flats Airstrip
LICENCE NO.

DRILLING DATE 17/04/19
TOTAL DEPTH 0.1m
DIAMETER N/A
PID Mini RAE

LOCATION East of Building
WEATHER Fine
SURFACE COND. Grassed Cover

COMMENTS

LOGGED BY AHJ of Robson Environmental
CHECKED BY

Drilling Method	Depth (m)	Sample ID	PID	Graphic Log	Material Description	Moisture	Consistency	Additional Observations
SHOVEL	0.05	S12_0-0.1	0.1	▥	CLAYEY SILT, BROWN, DRY, SOFT, ROOTLETS, MOD PLASTICITY	Dry		Top Soil
	0.1 0.15 0.2 0.25 0.3 0.35 0.4 0.45 0.5 0.55 0.6 0.65 0.7 0.75 0.8 0.85 0.9 0.95				End of BH S12@ 0.1m			TARGET @ 0.1m REACHED

SOIL SAMPLING BOREHOLE S13

PROJECT NUMBER J17188
PROJECT NAME Snowy Hydro 2.0
CLIENT Snowy Hydro Limited
ADDRESS Polo Flats Airstrip
LICENCE NO.

DRILLING DATE 17/04/19
TOTAL DEPTH 0.1m
DIAMETER N/A
PID Mini RAE

LOCATION Southern End of Airstrip
WEATHER Fine
SURFACE COND. Grassed

COMMENTS

LOGGED BY AHJ of Robson Environmental
CHECKED BY

Drilling Method	Depth (m)	Sample ID	PID	Graphic Log	Material Description	Moisture	Consistency	Additional Observations
SHOVEL	0.05	S13_0-0.1	0.3	▥	CLAYEY SILT, BROWN, DRY, HARD, ROOTLETS, MOD PLASTICITY	Dry		Top Soil
	0.1 0.15 0.2 0.25 0.3 0.35 0.4 0.45 0.5 0.55 0.6 0.65 0.7 0.75 0.8 0.85 0.9 0.95				End of BH S13@ 0.1m			TARGET @ 0.1m REACHED

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SOIL SAMPLING BOREHOLE S14

PROJECT NUMBER J17188
PROJECT NAME Snowy Hydro 2.0
CLIENT Snowy Hydro Limited
ADDRESS Polo Flats Airstrip
LICENCE NO.

DRILLING DATE 17/04/19
TOTAL DEPTH 0.5m
DIAMETER N/A
PID Mini RAE

LOCATION Southern End of Airstrip
WEATHER Fine
SURFACE COND. Grassed Cover

COMMENTS

LOGGED BY AHJ of Robson Environmental
CHECKED BY

Drilling Method	Depth (m)	Sample ID	PID	Graphic Log	Material Description	Moisture	Consistency	Additional Observations
Shovel		S14_0-0.1		▥	CLAYEY SILT, BROWN, HARD, MOD PLAST	Dry		Top Soil
Hand Auger	0.05		0.3					
	0.1							
	0.15							
	0.2							
	0.25							
	0.3			▨	Clay, Brown, High Plasticity		Firm	Natural
	0.35							
	0.4	S14_0.4-0.5						
	0.45		0.2					
	0.5				End of BH S14 @ 0.5m			Target @0.5m Reached
	0.55							
	0.6							
	0.65							
	0.7							
	0.75							
	0.8							
	0.85							
	0.9							
	0.95							

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SOIL SAMPLING BOREHOLE S15

PROJECT NUMBER J17188
PROJECT NAME Snowy Hydro 2.0
CLIENT Snowy Hydro Limited
ADDRESS Polo Flats Airstrip
LICENCE NO.

DRILLING DATE 17/04/19
TOTAL DEPTH 0.1m
DIAMETER N/A
PID Mini RAE

LOCATION Southern End of Airstrip
WEATHER Fine
SURFACE COND. Grassed

COMMENTS

LOGGED BY AHJ of Robson Environmental
CHECKED BY

Drilling Method	Depth (m)	Sample ID	PID	Graphic Log	Material Description	Moisture	Consistency	Additional Observations
SHOVEL	0.05	S15_0-0.1 QC03 QC04	0.3		CLAYEY SILT, BROWN, DRY, HARD, MOD PLASTICITY	Dry		Top Soil
	0.1				End of BH S15@ 0.1m			TARGET @ 0.1m REACHED
	0.15							
	0.2							
	0.25							
	0.3							
	0.35							
	0.4							
	0.45							
	0.5							
	0.55							
	0.6							
	0.65							
	0.7							
	0.75							
	0.8							
	0.85							
	0.9							
	0.95							

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SOIL SAMPLING BOREHOLE S16

PROJECT NUMBER J17188
PROJECT NAME Snowy Hydro 2.0
CLIENT Snowy Hydro Limited
ADDRESS Polo Flats Airstrip
LICENCE NO.

DRILLING DATE 17/04/19
TOTAL DEPTH 0.1m
DIAMETER N/A
PID Mini RAE

LOCATION Southern End of Airstrip
WEATHER Fine
SURFACE COND. Grassed

COMMENTS

LOGGED BY AHJ of Robson Environmental
CHECKED BY

Drilling Method	Depth (m)	Sample ID	PID	Graphic Log	Material Description	Moisture	Consistency	Additional Observations
SHOVEL	0.05	S16_0-0.1	0.1	▥	CLAYEY SILT, BROWN, DRY, HARD, MOD PLASTICITY	Dry		Top Soil
	0.1 0.15 0.2 0.25 0.3 0.35 0.4 0.45 0.5 0.55 0.6 0.65 0.7 0.75 0.8 0.85 0.9 0.95				End of BH S16@ 0.1m			TARGET @ 0.1m REACHED

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SOIL SAMPLING BOREHOLE S17

PROJECT NUMBER J17188
PROJECT NAME Snowy Hydro 2.0
CLIENT Snowy Hydro Limited
ADDRESS Polo Flats Airstrip
LICENCE NO.

DRILLING DATE 17/04/19
TOTAL DEPTH 0.1m
DIAMETER N/A
PID Mini RAE

LOCATION Southern End of Airstrip
WEATHER Fine
SURFACE COND. Grassed

COMMENTS

LOGGED BY AHJ of Robson Environmental
CHECKED BY

Drilling Method	Depth (m)	Sample ID	PID	Graphic Log	Material Description	Moisture	Consistency	Additional Observations
SHOVEL	0.05	S17_0-0.1	0.1	▥	CLAYEY SILT, BROWN, DRY, HARD, MOD PLASTICITY	Dry		Top Soil
	0.1 0.15 0.2 0.25 0.3 0.35 0.4 0.45 0.5 0.55 0.6 0.65 0.7 0.75 0.8 0.85 0.9 0.95				End of BH S17@ 0.1m			TARGET @ 0.1m REACHED

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SOIL SAMPLING BOREHOLE S18

PROJECT NUMBER J17188
PROJECT NAME Snowy Hydro 2.0
CLIENT Snowy Hydro Limited
ADDRESS Polo Flats Airstrip
LICENCE NO.

DRILLING DATE 17/04/19
TOTAL DEPTH 0.1m
DIAMETER N/A
PID Mini RAE

LOCATION Southern End of Airstrip
WEATHER Fine
SURFACE COND. Grassed

COMMENTS

LOGGED BY AHJ of Robson Environmental
CHECKED BY

Drilling Method	Depth (m)	Sample ID	PID	Graphic Log	Material Description	Moisture	Consistency	Additional Observations
SHOVEL	0.05	S18_0-0.1	0.3		CLAYEY SILT, BROWN, DRY, HARD, MOD PLASTICITY	Dry		Top Soil
	0.1 0.15 0.2 0.25 0.3 0.35 0.4 0.45 0.5 0.55 0.6 0.65 0.7 0.75 0.8 0.85 0.9 0.95				End of BH S18@ 0.1m			TARGET @ 0.1m REACHED

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SOIL SAMPLING BOREHOLE S19

PROJECT NUMBER J17188
PROJECT NAME Snowy Hydro 2.0
CLIENT Snowy Hydro Limited
ADDRESS Polo Flats Airstrip
LICENCE NO.

DRILLING DATE 17/04/19
TOTAL DEPTH 0.5m
DIAMETER N/A
PID Mini RAE

LOCATION Southern End of Airstrip
WEATHER Fine
SURFACE COND. Grassed Cover

COMMENTS

LOGGED BY AHJ of Robson Environmental
CHECKED BY

Drilling Method	Depth (m)	Sample ID	PID	Graphic Log	Material Description	Moisture	Consistency	Additional Observations
Shovel		S19_0-0.1		▥	CLAYEY SILT, BROWN, HARD, MOD PLAST	Dry		Top Soil
Hand Auger	0.05		0.3					
	0.1							
	0.15							
	0.2							
	0.25							
	0.3			▨	Clay, Brown, High Plasticity		Firm	Natural
	0.35							
	0.4	S19_0.4-0.5						
	0.45		0.2					
	0.5				End of BH S19 @ 0.5m			Target @0.5m Reached
	0.55							
	0.6							
	0.65							
	0.7							
	0.75							
	0.8							
	0.85							
	0.9							
	0.95							

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SOIL SAMPLING BOREHOLE S20

PROJECT NUMBER J17188
PROJECT NAME Snowy Hydro 2.0
CLIENT Snowy Hydro Limited
ADDRESS Polo Flats Airstrip
LICENCE NO.

DRILLING DATE 17/04/19
TOTAL DEPTH 0.5m
DIAMETER N/A
PID Mini RAE

LOCATION Southern End of Airstrip
WEATHER Fine
SURFACE COND. Grassed Cover

COMMENTS

LOGGED BY AHJ of Robson Environmental
CHECKED BY

Drilling Method	Depth (m)	Sample ID	PID	Graphic Log	Material Description	Moisture	Consistency	Additional Observations
Shovel		S20_0-0.1		▥	CLAYEY SILT, BROWN, HARD, MOD PLAST	Dry		Top Soil
Hand Auger	0.05		0.2					
	0.1							
	0.15							
	0.2			▨	Clayey Silt, W/Rock Fragments, Brown, Hard, Mod Plasticity			Fill
	0.25							
	0.3							
	0.35							
	0.4	S20_0.4-0.5						
	0.45		0.3					
	0.5				End of BH S20 @ 0.5m			Target @0.5m Reached
	0.55							
	0.6							
	0.65							
	0.7							
	0.75							
	0.8							
	0.85							
	0.9							
	0.95							

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SOIL SAMPLING BOREHOLE S21

PROJECT NUMBER J17188
PROJECT NAME Snowy Hydro 2.0
CLIENT Snowy Hydro Limited
ADDRESS Polo Flats Airstrip
LICENCE NO.

DRILLING DATE 17/04/19
TOTAL DEPTH 0.1m
DIAMETER N/A
PID Mini RAE

LOCATION Southern End of Airstrip
WEATHER Fine
SURFACE COND. Grassed

COMMENTS

LOGGED BY AHJ of Robson Environmental
CHECKED BY

Drilling Method	Depth (m)	Sample ID	PID	Graphic Log	Material Description	Moisture	Consistency	Additional Observations
SHOVEL	0.05	S21_0-0.1	1.2	▥	CLAYEY SILT, BROWN, DRY, HARD, MOD PLASTICITY	Dry		Top Soil
	0.1 0.15 0.2 0.25 0.3 0.35 0.4 0.45 0.5 0.55 0.6 0.65 0.7 0.75 0.8 0.85 0.9 0.95				End of BH S21@ 0.1m			TARGET @ 0.1m REACHED

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SOIL SAMPLING BOREHOLE S22

PROJECT NUMBER J17188
PROJECT NAME Snowy Hydro 2.0
CLIENT Snowy Hydro Limited
ADDRESS Polo Flats Airstrip
LICENCE NO.

DRILLING DATE 17/04/19
TOTAL DEPTH 0.1m
DIAMETER N/A
PID Mini RAE

LOCATION Southern End of Airstrip
WEATHER Fine
SURFACE COND. Grassed

COMMENTS

LOGGED BY AHJ of Robson Environmental
CHECKED BY

Drilling Method	Depth (m)	Sample ID	PID	Graphic Log	Material Description	Moisture	Consistency	Additional Observations
SHOVEL	0.05	S22_0-0.1	1.8	▥	CLAYEY SILT, BROWN, DRY, HARD, MOD PLASTICITY	Dry		Top Soil
	0.1 0.15 0.2 0.25 0.3 0.35 0.4 0.45 0.5 0.55 0.6 0.65 0.7 0.75 0.8 0.85 0.9 0.95				End of BH S22@ 0.1m			TARGET @ 0.1m REACHED

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Annexure D

Laboratory results

	Unit	EQL	ANZG (2018) Freshwater 95% toxicant DGVs	NEPM 2013 Table 1A(4) Comm/Ind HSL D GW for Vapour Intrusion,	PFAS NEMP 2018 Table 5 Freshwater 95%	Field ID	MB01	MB02	MB03	MB04A	MB04B	MB05	MB06
						Date	31/05/2019	31/05/2019	31/05/2019	31/05/2019	31/05/2019	31/05/2019	31/05/2019
Field													
pH	-	0.01					**7.56**	**8.85**	**7.70**	**7.75**	**8.08**	**7.92**	**8.19**
Metals													
Aluminium	**mg/L**	0.009	0.055				**33.7**	**1.12**	**2.68**	**6.22**	**0.257**	**5.42**	**1.77**
Barium	**mg/L**	0.0005					**0.0793**	**0.0042**	**0.0274**	**0.153**	**0.0221**	**0.0317**	**0.0127**
Arsenic	**mg/L**	0.001					**0.001**	<0.001	<0.001	**0.002**	<0.001	<0.001	**0.002**
Cadmium	**mg/L**	0.00005	0.0002				<0.00005	<0.00005	<0.00005	**0.00012**	<0.00005	<0.00005	<0.00005
Antimony	**mg/L**	0.003					<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003
Beryllium	**mg/L**	0.0001					**0.0009**	<0.0001	**0.0002**	**0.0004**	<0.0001	**0.0005**	<0.0001
Molybdenum	**mg/L**	0.001					<0.001	**0.001**	<0.001	<0.001	**0.002**	<0.001	**0.001**
Chromium (III+VI)	**mg/L**	0.002					**0.053**	**0.002**	**0.004**	**0.005**	<0.002	**0.009**	**0.004**
Cobalt	**mg/L**	0.0002					**0.0402**	**0.0010**	**0.0036**	**0.0078**	**0.0004**	**0.0051**	**0.0019**
Copper	**mg/L**	0.001	0.0014				**0.037**	**0.002**	**0.004**	**0.008**	<0.001	**0.007**	**0.004**
Iron	**mg/L**	0.01					**30.8**	**1.02**	**2.02**	**8.84**	**0.28**	**4.64**	**1.61**
Lead	**mg/L**	0.0002	0.0034				**0.0065**	<0.0002	**0.0020**	**0.0077**	<0.0002	**0.0034**	**0.0041**
Manganese	**mg/L**	0.0005	1.9				**0.883**	**0.0163**	**0.0832**	**1.46**	**0.0107**	**0.149**	**0.0382**
Mercury	**mg/L**	0.0001	0.0006				<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001
Nickel	**mg/L**	0.001	0.011				**0.13**	**0.005**	**0.015**	**0.01**	**0.003**	**0.025**	**0.012**
Selenium	**mg/L**	0.001	0.011				**0.002**	<0.001	**0.002**	**0.004**	**0.001**	**0.003**	**0.001**
Silver	**mg/L**	0.001	0.00005				<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Zinc	**mg/L**	0.005	0.008				**0.07**	**0.008**	**0.015**	**0.025**	**0.006**	**0.02**	**0.059**
Asbestos													
APPROVED IDENTIFIER:	--	1					**1**	**1**	**1**	**1**	**1**	**1**	**1**
Asbestos Type	-						**1**	**1**	**1**	**1**	**1**	**1**	**1**
Asbestos fibres	-						**0**	**0**	**0**	**0**	**0**	**0**	**0**
NA													
Description	--	1					**1**	**1**	**1**	**1**	**1**	**1**	**1**
Total Dissolved Solids	**mg/L**	10					**589**	**226**	**486**	**504**	**322**	**528**	**295**
PFOS/PFOA													
6:2 Fluorotelomer sulfonic acid (6:2 FTS)	**mg/L**	0.00005					<0.00005	<0.00005	<0.00005	<0.00005	<0.00005	<0.00005	<0.00005
8:2 Fluorotelomer sulfonic acid (8:2 FTS)	**mg/L**	0.00005					<0.00005	<0.00005	<0.00005	<0.00005	<0.00005	<0.00005	<0.00005
Perfluorohexane sulfonic acid (PFHxS)	**µg/L**	0.02					<0.02	<0.02	**0.03**	<0.02	<0.02	**0.03**	<0.02
Perfluorooctanesulfonic acid (PFOS)	**mg/L**	0.00001			0.00013		<0.00001	<0.00001	**0.00003**	<0.00001	<0.00001	**0.00001**	<0.00001
Perfluorooctanoic acid (PFOA)	**mg/L**	0.00001			0.22		<0.00001	<0.00001	**0.00003**	<0.00001	<0.00001	**0.00006**	**0.00002**
Sum of PFAS	**µg/L**	0.01					<0.01	<0.01	**0.09**	<0.01	<0.01	**0.20**	**0.02**
10:2 Fluorotelomer sulfonic acid (10:2 FTS)	**µg/L**	0.05					<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
4:2 Fluorotelomer sulfonic acid (4:2 FTS)	**µg/L**	0.05					<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
N-Ethyl perfluorooctane sulfonamide (NEtFOSA)	**µg/L**	0.05					<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
N-ethyl-perfluorooctanesulfonamidoacetic acid (NEtFOSAA)	**µg/L**	0.02					<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02
N-ethylperfluorooctanesulfonamidoethanol (NEtFOSE)	**µg/L**	0.05					<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
N-Methyl perfluorooctane sulfonamide (NMeFOSA)	**µg/L**	0.05					<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
N-methylperfluorooctane sulfonamidoacetic acid (NMeFOSAA)	**µg/L**	0.02					<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02
N-Methylperfluorooctanesulfonamidoethanol (N-MeFOSE)	**µg/L**	0.05					<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Perfluorobutane sulfonic acid (PFBS)	**µg/L**	0.02					<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02
Perfluorobutanoic acid (PFBA)	**µg/L**	0.1					<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Perfluorodecanesulfonic acid (PFDS)	**µg/L**	0.02					<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02
Perfluorodecanoic acid (PFDA)	**µg/L**	0.02					<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02
Perfluorododecanoic acid (PFDoDA)	**µg/L**	0.02					<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02
Perfluoroheptane sulfonic acid (PFHpS)	**µg/L**	0.02					<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02
Perfluoroheptanoic acid (PFHpA)	**µg/L**	0.02					<0.02	<0.02	<0.02	<0.02	<0.02	**0.02**	<0.02
Perfluorohexanoic acid (PFHxA)	**µg/L**	0.02					<0.02	<0.02	<0.02	<0.02	<0.02	**0.05**	<0.02
Perfluorononanoic acid (PFNA)	**µg/L**	0.02					<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02
Perfluorooctane sulfonamide (PFOSA)	**µg/L**	0.02					<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02
Perfluoropentane sulfonic acid (PFPeS)	**µg/L**	0.02					<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02
Perfluoropentanoic acid (PFPeA)	**µg/L**	0.02					<0.02	<0.02	<0.02	<0.02	<0.02	**0.03**	<0.02
Perfluorotetradecanoic acid (PFTeDA)	**µg/L**	0.05					<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Perfluorotridecanoic acid (PFTrDA)	**µg/L**	0.02					<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02
Perfluoroundecanoic acid (PFUnDA)	**µg/L**	0.02					<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02
Halogenated Benzenes													
Hexachlorobenzene	**µg/L**	0.5					<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Organochlorine Pesticides													
4,4-DDE	**µg/L**	0.5					<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
a-BHC	**µg/L**	0.5					<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Aldrin	**µg/L**	0.5					<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
b-BHC	**µg/L**	0.5					<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Chlordane (cis)	**µg/L**	0.5					<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Chlordane (trans)	**µg/L**	0.5					<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
d-BHC	**µg/L**	0.5					<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
DDD	**µg/L**	0.5					<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
DDT	**µg/L**	2	0.01				<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0
Dieldrin	**µg/L**	0.5					<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Endosulfan I	**µg/L**	0.5					<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Endosulfan II	**µg/L**	0.5					<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Endosulfan sulphate	**µg/L**	0.5					<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Endrin	**µg/L**	0.5	0.02				<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Endrin aldehyde	**µg/L**	0.5					<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Endrin ketone	**µg/L**	0.5					<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
g-BHC (Lindane)	**µg/L**	0.5	0.2				<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Heptachlor	**µg/L**	0.5	0.09				<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Heptachlor epoxide	**µg/L**	0.5					<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Methoxychlor	**µg/L**	2					<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0
Organophosphorous Pesticides													
Azinophos methyl	**µg/L**	0.5	0.02				<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Bromophos-ethyl	**µg/L**	0.5					<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Chlorpyrifos	**µg/L**	0.5	0.01				<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Chlorpyrifos-methyl	**mg/L**	0.0005					<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005
Diazinon	**µg/L**	0.5	0.01				<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Dichlorvos	**µg/L**	0.5					<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Dimethoate	**µg/L**	0.5	0.15				<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Ethion	**µg/L**	0.5					<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Malathion	**µg/L**	0.5	0.05				<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Carbophenothion	**µg/L**	0.5					<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Chlorfenvinphos	**µg/L**	0.5					<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Fenthion	**µg/L**	0.5					<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Methyl parathion	**µg/L**	2					<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0
Monocrotophos	**µg/L**	2					<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0
Prothiofos	**µg/L**	0.5					<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
PCBs													
PCBs (Sum of total)	**µg/L**	1					<1	<1	<1	<1	<1	<1	<1
Pesticides													
Parathion	**µg/L**	2	0.004				<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0
Demeton-S-methyl	**µg/L**	0.5					<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Fenamiphos	**µg/L**	0.5					<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Pirimphos-ethyl	**µg/L**	0.5					<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5

	Unit	EQL	NEPM 2013 Table 1A(1) HILs Comm/Ind D	NEPM 2013 Table 1A(3) Comm/Ind D Soil HSL for	Table 1B(5) Table 1B(5) Generic EIL - Comm/Ind	NEPM 2013 Table 1B(6) ESLs for Comm/Ind,	NEPM 2013 Table 1B(7) Management Limits Comm /	PFAS NEMP 2019 Table 1 Commercial/Industrial	Field ID	S01_0-0.1	S02_0-0.1	S02_0.4-0.5	S03_0-0.1	S04_0-0.1	S04_-0.4-0.5	S05_0-0.1	S05_0.4-0.5	S06_0-0.1	S06_0.4-0.5	S07_0-0.1	S08_0-0.1	S08_0.3-0.4	S09_0-0.1	S10_0-0.1	S11_0-0.1	S11_0.4-0.5	S12_0-0.1	S13_0-0.1	S14_0-0.1	S14_0.4-0.5	S15_0-0.1	S16_0-0.1	S16_0-0.1	S17_0-0.1	S18_0-0.1	S19_0-0.1	S19_0.4-0.5	S20_0-0.1	S20_0.4-0.5	S21_0-0.1	S22_0-0.1
									Date	17/04/2019	17/04/2019	17/04/2019	17/04/2019	17/04/2019	17/04/2019	17/04/2019	17/04/2019	17/04/2019	17/04/2019	17/04/2019	17/04/2019	17/04/2019	17/04/2019	17/04/2019	17/04/2019	17/04/2019	17/04/2019	17/04/2019	17/04/2019	17/04/2019	17/04/2019	17/04/2019	17/04/2019	17/04/2019	17/04/2019	17/04/2019	17/04/2019	17/04/2019	17/04/2019	17/04/2019	17/04/2019
Inorganics																																									
% Moisture	mg/kg	5,000								85,000	43,000	250,000	28,000	54,000	120,000	280,000	280,000	43,000	220,000	22,000	34,000	33,000	45,000	190,000	190,000	240,000	42,000	120,000	150,000	220,000	110,000	31,000	40,000	120,000	110,000	98,000	240,000	58,000	38,000	130,000	150,000
Metals																																									
Arsenic	mg/kg	1	3,000		160					<1	3	10	11	4	5	3	13	3	4	3	2	9	2	3	3	4	3	13	4	3	4		5	4	2	4	2	5	2	3	4
Cadmium	mg/kg	0.3	900							<0.3	<0.3	<0.3	0.3	<0.3	<0.3	1.9	<0.3	<0.3	<0.3	<0.3	<0.3	<0.3	<0.3	0.9	<0.3	<0.3	<0.3	<0.3	<0.3	<0.3	<0.3		<0.3	<0.3	<0.3	<0.3	<0.3	<0.3	<0.3	<0.3	<0.3
Chromium (III+VI)	mg/kg	0.3								19	17	40	4.4	42	54	45	63	16	46	12	21	8.6	21	42	20	51	21	53	75	84	70		11	53	74	69	100	18	59	64	94
Copper	mg/kg	0.5	240,000							8.6	7.3	120	3.2	76	40	64	46	6.9	79	5.9	8.4	3.2	8.5	47	11	28	8.7	32	45	40	38		8	35	43	49	45	12	41	33	44
Lead	mg/kg	1	1,500							12	6	25	11	20	10	110	11	10	18	8	4	10	5	43	19	7	12	16	32	7	140		30	49	34	160	9	47	8	45	46
Mercury	mg/kg	0.05	730							<0.05	<0.05	0.35	<0.05	0.11	<0.05	0.11	<0.05	<0.05	0.09	<0.05	<0.05	<0.05	<0.05	0.08	<0.05	<0.05	<0.05	0.22	<0.05	<0.05	<0.05		<0.05	<0.05	<0.05	0.06	<0.05	<0.05	<0.05	<0.05	<0.05
Nickel	mg/kg	0.5	6,000							9.2	8.1	42	1.1	62	53	47	70	7.8	67	6.3	9.5	4.3	9.5	53	9.4	66	12	51	72	89	67		9.3	82	89	69	110	19	110	64	96
Zinc	mg/kg	2	400,000							40	28	52	300	66	40	1,300	81	33	54	25	33	21	36	320	40	43	34	63	95	66	66		28	71	80	110	79	38	44	68	83
Asbestos																																									
Asbestos fibres	Detect	0								0	0					0				0	0			0	0		0		0				0		0	0		0			
Asbestos in soil (<2mm AF/FA)	%w/w	0.001								<0.001	<0.001					<0.001				<0.001	<0.001			<0.001	<0.001		<0.001		<0.001				<0.001		<0.001	<0.001		<0.001			
Asbestos in soil (<7mm AF/FA)	%	0.001								<0.001	<0.001					<0.001				<0.001	<0.001			<0.001	<0.001		<0.001		<0.001				<0.001		<0.001	<0.001		<0.001			
Asbestos in soil (>2mm <7mm AF/FA)	%w/w	0.001								<0.001	<0.001					<0.001				<0.001	<0.001			<0.001	<0.001		<0.001		<0.001				<0.001		<0.001	<0.001		<0.001			
Mass ACM	g	0.01								<0.01	<0.01					<0.01				<0.01	<0.01			<0.01	<0.01		<0.01		<0.01				<0.01		<0.01	<0.01		<0.01			
Mass asbestos in AF	g	0.0001								<0.0001	<0.0001					<0.0001				<0.0001	<0.0001			<0.0001	<0.0001		<0.0001		<0.0001				<0.0001		<0.0001	<0.0001		<0.0001			
Mass Asbestos in FA & AF	g	0.0001								<0.0001	<0.0001					<0.0001				<0.0001	<0.0001			<0.0001	<0.0001		<0.0001		<0.0001				<0.0001		<0.0001	<0.0001		<0.0001			
NA																																									
Perfluorobutanesulfonate	mg/kg	0.0001								<0.0001		<0.0001				<0.0001	<0.0001			<0.0001	<0.0001	<0.0001			<0.0001	<0.0001	<0.0001		<0.0001	<0.0001	<0.0001	<0.0001			<0.0001	<0.0001	<0.0001	<0.0001	<0.0001		
ACM>7mm Estimation % (w/w)*	%w/w									<0.01	<0.01					<0.01				<0.01	<0.01			<0.01	<0.01		<0.01		<0.01				<0.01		<0.01	<0.01		<0.01			
weight of sample	g	1								587	697					437				845	740			389	477		676		577				967		528	637		634			
BTEX																																									
Benzene	mg/kg	0.1								<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1		<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Ethylbenzene	mg/kg	0.1								<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1		<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Toluene	mg/kg	0.1								<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1		<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Total BTEX	mg/kg	0.6								<0.6	<0.6	<0.6	<0.6	<0.6	<0.6	<0.6	<0.6	<0.6	<0.6	<0.6	<0.6	<0.6	<0.6	<0.6	<0.6	<0.6	<0.6	<0.6	<0.6	<0.6	<0.6		<0.6	<0.6	<0.6	<0.6	<0.6	<0.6	<0.6	<0.6	<0.6
Xylene (m & p)	mg/kg	0.2								<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2		<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2
Xylene (o)	mg/kg	0.1								<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1		<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Xylene Total	mg/kg	0.3								<0.3	<0.3	<0.3	<0.3	<0.3	<0.3	<0.3	<0.3	<0.3	<0.3	<0.3	<0.3	<0.3	<0.3	<0.3	<0.3	<0.3	<0.3	<0.3	<0.3	<0.3	<0.3		<0.3	<0.3	<0.3	<0.3	<0.3	<0.3	<0.3	<0.3	<0.3
PFOS/PFOA																																									
4:2 Fluorotelomer sulfonic acid (4:2 FTS)	µg/kg	1								<1		<1				<1	<1			<1	<1	<1			<1	<1	<1		<1	<1	<1	<1			<1	<1	<1	<1	<1		
6:2 Fluorotelomer Sulfonate (6:2 FTS)	µg/kg	1								<1		<1				<1	<1			<1	<1	<1			<1	<1	<1		<1	<1	<1	<1			<1	<1	<1	<1	<1		
N-Ethyl perfluorooctane sulfonamide (NEtFOSA)	µg/kg	1								<1		<1				<1	<1			<1	<1	<1			<1	<1	<1		<1	<1	<1	<1			<1	<1	<1	<1	<1		
N-ethyl-perfluorooctanesulfonamidoacetic acid (NEtFOSAA)	µg/kg	1								<1		<1				<1	<1			<1	<1	<1			<1	<1	<1		<1	<1	<1	<1			<1	<1	<1	<1	<1		
N-ethylperfluorooctanesulfonamidoethanol (NEtFOSE)	µg/kg	2								<2		<2				<2	<2			<2	<2	<2			<2	<2	<2		<2	<2	<2	<2			<2	<2	<2	<2	<2		
N-Methyl perfluorooctane sulfonamide (NMeFOSA)	µg/kg	1								<1		<1				<1	<1			<1	<1	<1			<1	<1	<1		<1	<1	<1	<1			<1	<1	<1	<1	<1		
N-methylperfluorooctane sulfonamidoacetic acid (NMeFOSAA)	µg/kg	1								<1		<1				<1	<1			<1	<1	<1			<1	<1	<1		<1	<1	<1	<1			<1	<1	<1	<1	<1		
N-Methylperfluorooctanesulfonamidoethanol (N-MeFOSE)	mg/kg	0.002								<0.002		<0.002				<0.002	<0.002			<0.002	<0.002	<0.002			<0.002	<0.002	<0.002		<0.002	<0.002	<0.002	<0.002			<0.002	<0.002	<0.002	<0.002	<0.002		
Perfluoro-1-dodecanesulfonate	µg/kg	0.1								<0.1		<0.1				<0.1	<0.1			<0.1	<0.1	<0.1			<0.1	<0.1	<0.1		<0.1	<0.1	<0.1	<0.1			<0.1	<0.1	<0.1	<0.1	<0.1		
Perfluorobutanoic acid (PFBA)	µg/kg	0.1								<0.1		<0.1				0.1	<0.1			<0.1	<0.1	<0.1			<0.1	<0.1	<0.1		0.3	<0.1	0.3	<0.1			0.2	0.2	<0.1	<0.1	<0.1		
Perfluorodecanesulfonic acid (PFDS)	µg/kg	0.1								<0.1		<0.1				<0.1	<0.1			<0.1	<0.1	<0.1			<0.1	<0.1	<0.1		<0.1	<0.1	<0.1	<0.1			<0.1	<0.1	<0.1	<0.1	<0.1		
8:2 Fluorotelomer sulfonic acid (8:2 FTS)	mg/kg	0.001								<0.001		<0.001				<0.001	<0.001			<0.001	<0.001	<0.001			<0.001	<0.001	<0.001		<0.001	<0.001	<0.001	<0.001			<0.001	<0.001	<0.001	<0.001	<0.001		
Perfluorodecanoic acid (PFDA)	µg/kg	0.1								<0.1		<0.1				<0.1	<0.1			<0.1	<0.1	<0.1			<0.1	<0.1	<0.1		<0.1	<0.1	<0.1	<0.1			<0.1	<0.1	<0.1	<0.1	<0.1		
Perfluorohexane sulfonic acid (PFHxS)	µg/kg	0.1								<0.1		<0.1				<0.1	<0.1			<0.1	<0.1	<0.1			<0.1	0.1	<0.1		<0.1	<0.1	<0.1	<0.1			<0.1	<0.1	<0.1	<0.1	<0.1		
Perfluorododecanoic acid (PFDoDA)	µg/kg	0.1								<0.1		<0.1				<0.1	<0.1			<0.1	<0.1	<0.1			<0.1	<0.1	<0.1		<0.1	<0.1	<0.1	<0.1			<0.1	<0.1	<0.1	<0.1	<0.1		
Perfluorooctanesulfonic acid (PFOS)	mg/kg	0.0001								0.0004		<0.0001				0.0070	0.0007			0.0002	<0.0001	<0.0001			0.0032	0.0002	0.0004		0.0004	<0.0001	0.0002	<0.0001			<0.0001	0.0001	<0.0001	0.0001	<0.0001		
Perfluoroheptane sulfonic acid (PFHpS)	µg/kg	0.1								<0.1		<0.1				<0.1	<0.1			<0.1	<0.1	<0.1			<0.1	<0.1	<0.1		<0.1	<0.1	<0.1	<0.1			<0.1	<0.1	<0.1	<0.1	<0.1		
Perfluorooctanoic acid (PFOA)	mg/kg	0.0001						50		<0.0001		<0.0001				<0.0001	0.0002			<0.0001	<0.0001	<0.0001			0.0002	<0.0001	<0.0001		<0.0001	<0.0001	<0.0001	<0.0001			<0.0001	<0.0001	<0.0001	<0.0001	<0.0001		
Perfluoroheptanoic acid (PFHpA)	µg/kg	0.1								<0.1		<0.1				<0.1	<0.1			<0.1	<0.1	<0.1			<0.1	<0.1	<0.1		<0.1	<0.1	<0.1	<0.1			<0.1	<0.1	<0.1	<0.1	<0.1		
Perfluorohexanoic acid (PFHxA)	µg/kg	0.1								<0.1		<0.1				<0.1	<0.1			<0.1	<0.1	<0.1			<0.1	<0.1	<0.1		<0.1	<0.1	<0.1	<0.1			<0.1	<0.1	<0.1	<0.1	<0.1		
Sum of PFHxS and PFOS	µg/kg	0.1						20000		0.4		<0.1				7.0	0.7			0.2	<0.1	<0.1			3.2	0.3	0.4		0.4	<0.1	0.2	<0.1			<0.1	0.1	<0.1	0.1	<0.1		
Perfluoro-n-hexadecanoic acid (PFHxDA)	µg/kg	0.1								<0.1		<0.1				<0.1	<0.1			<0.1	<0.1	<0.1			<0.1	<0.1	<0.1		<0.1	<0.1	<0.1	<0.1			<0.1	<0.1	<0.1	<0.1	<0.1		
Perfluorononanesulfonic acid (PFNS)	µg/kg	0.1								<0.1		<0.1				<0.1	<0.1			<0.1	<0.1	<0.1			<0.1	<0.1	<0.1		<0.1	<0.1	<0.1	<0.1			<0.1	<0.1	<0.1	<0.1	<0.1		
Perfluorononanoic acid (PFNA)	µg/kg	0.1								<0.1		<0.1				<0.1	<0.1			<0.1	<0.1	<0.1			<0.1	<0.1	<0.1		<0.1	<0.1	<0.1	<0.1			<0.1	<0.1	<0.1	<0.1	<0.1		
Perfluorooctane sulfonamide (PFOSA)	µg/kg	1								<1		<1				<1	<1			<1	<1	<1			<1	<1	<1		<1	<1	<1	<1			<1	<1	<1	<1	<1		
Perfluoropentane sulfonic acid (PFPeS)	µg/kg	0.1								<0.1		<0.1				<0.1	<0.1			<0.1	<0.1	<0.1			<0.1	<0.1	<0.1		<0.1	<0.1	<0.1	<0.1			<0.1	<0.1	<0.1	<0.1	<0.1		
Perfluoropentanoic acid (PFPeA)	µg/kg	0.5								<0.5		<0.5				<0.5	<0.5			<0.5	<0.5	<0.5			<0.5	<0.5	<0.5		<0.5	<0.5	<0.5	<0.5			<0.5	<0.5	<0.5	<0.5	<0.5		
Perfluorotetradecanoic acid (PFTeDA)	µg/kg	0.1								<0.1		<0.1				<0.1	<0.1			<0.1	<0.1	<0.1			<0.1	<0.1	<0.1		<0.1	<0.1	<0.1	<0.1			<0.1	<0.1	<0.1	<0.1	<0.1		
Perfluorotridecanoic acid (PFTrDA)	µg/kg	0.1								<0.1		<0.1				<0.1	<0.1			<0.1	<0.1	<0.1			<0.1	<0.1	<0.1		<0.1	<0.1	<0.1	<0.1			<0.1	<0.1	<0.1	<0.1	<0.1		
Perfluoroundecanoic acid (PFUnDA)	µg/kg	0.1								<0.1		<0.1				<0.1	<0.1			<0.1	<0.1	<0.1			<0.1	<0.1	<0.1		<0.1	<0.1	<0.1	<0.1			<0.1	<0.1	<0.1	<0.1	<0.1		
TRH																																									
C10-C16	mg/kg	25					1,000			<25	<25	<25	<25	<25	<25	<25	<25	<25	<25	<25	<25	<25	<25	<25	<25	<25	<25	<25	<25	<25	<25		<25	<25	<25	<25	<25	<25	<25	<25	<25
C10-C16 (F2 minus Naphthalene)	mg/kg	25		NL		170				<25	<25	<25	<25	<25	<25	<25	<25	<25	<25	<25	<25	<25	<25	<25	<25	<25	<25	<25	<25	<25	<25		<25	<25	<25	<25	<25	<25	<25	<25	<25
C10-C40 (Sum of total)	mg/kg	210								<210	<210	<210	<210	<210	<210	500	<210	<210	<210	<210	<210	<210	<210	<210	<210	<210	<210	<210	<210	<210	<210		<210	<210	<210	<210	<210	<210	<210	<210	<210
C16-C34	mg/kg	90				2,500	5,000			<90	<90	<90	<90	<90	<90	310	<90	<90	<90	<90	<90	<90	<90	170	<90	<90	<90	<90	<90	<90	<90		<90	<90	<90	<90	<90	<90	<90	<90	<90
C34-C40	mg/kg	120				6,600	10,000			<120	<120	<120	<120	<120	<120	200	<120	<120	<120	<120	<120	<120	<120	<120	<120	<120	<120	<120	<120	<120	<120		<120	<120	<120	<120	<120	<120	<120	<120	<120
C6-C10	mg/kg	25					800			<25	<25	<25	<25	<25	<25	<25	<25	<25	<25	<25	<25	<25	<25	<25	<25	<25	<25	<25	<25	<25	<25		<25	<25	<25	<25	<25	<25	<25	<25	<25
C6-C10 (F1 minus BTEX)	mg/kg	25		250		215				<25	<25	<25	<25	<25	<25	<25	<25	<25	<25	<25	<25	<25	<25	<25	<25	<25	<25	<25	<25	<25	<25		<25	<25	<25	<25	<25	<25	<25	<25	<25
Halogenated Benzenes																																									
Hexachlorobenzene	mg/kg	0.1	80								<0.1	<0.1				<0.1	<0.1			<0.1	<0.1	<0.1			<0.1	<0.1	<0.1		<0.1	<0.1	<0.1		<0.1		<0.1	<0.1	<0.1	<0.1	<0.1		
Organochlorine Pesticides																																									
2,4-DDT	mg/kg	0.1									<0.1	<0.1				<0.1	<0.1			<0.1	<0.1	<0.1			<0.1	<0.1	<0.1		<0.1	<0.1	<0.1		<0.1		<0.1	<0.1	<0.1	<0.1	<0.1		
4,4-DDE	mg/kg	0.1									<0.1	<0.1				<0.1	<0.1			<0.1	<0.1	<0.1			<0.1	<0.1	<0.1		<0.1	<0.1	<0.1		<0.1		<0.1	<0.1	<0.1	<0.1	<0.1		
a-BHC	mg/kg	0.1									<0.1	<0.1				<0.1	<0.1			<0.1	<0.1	<0.1			<0.1	<0.1	<0.1		<0.1	<0.1	<0.1		<0.1		<0.1	<0.1	<0.1	<0.1	<0.1		
Aldrin	mg/kg	0.1									<0.1	<0.1				<0.1	<0.1			<0.1	<0.1	<0.1			<0.1	<0.1	<0.1		<0.1	<0.1	<0.1		<0.1		<0.1	<0.1	<0.1	<0.1	<0.1		
b-BHC	mg/kg	0.1									<0.1	<0.1				<0.1	<0.1			<0.1	<0.1	<0.1			<0.1	<0.1	<0.1		<0.1	<0.1	<0.1		<0.1		<0.1	<0.1	<0.1	<0.1	<0.1		
Chlordane (cis)	mg/kg	0.1									<0.1	<0.1				<0.1	<0.1			<0.1	<0.1	<0.1			<0.1	<0.1	<0.1		<0.1	<0.1	<0.1		<0.1		<0.1	<0.1	<0.1	<0.1	<0.1		
d-BHC	mg/kg	0.1									<0.1	<0.1				<0.1	<0.1			<0.1	<0.1	<0.1			<0.1	<0.1	<0.1		<0.1	<0.1	<0.1		<0.1		<0.1	<0.1	<0.1	<0.1	<0.1		
DDD	mg/kg	0.1									<0.1	<0.1				<0.1	<0.1			<0.1	<0.1	<0.1			<0.1	<0.1	<0.1		<0.1	<0.1	<0.1		<0.1		<0.1	<0.1	<0.1	<0.1	<0.1		
DDT	mg/kg	0.1			640						<0.1	<0.1				<0.1	<0.1			<0.1	<0.1	<0.1			<0.1	<0.1	<0.1		<0.1	<0.1	<0.1		<0.1		<0.1	<0.1	<0.1	<0.1	<0.1		
Dieldrin	mg/kg	0.2									<0.2	<0.2				<0.2	<0.2			<0.2	<0.2	<0.2			<0.2	<0.2	<0.2		<0.2	<0.2	<0.2		<0.2		<0.2	<0.2	<0.2	<0.2	<0.2		
Endosulfan I	mg/kg	0.2									<0.2	<0.2				<0.2	<0.2			<0.2	<0.2	<0.2			<0.2	<0.2	<0.2		<0.2	<0.2	<0.2		<0.2		<0.2	<0.2	<0.2	<0.2	<0.2		
Endosulfan II	mg/kg	0.2									<0.2	<0.2				<0.2	<0.2			<0.2	<0.2	<0.2			<0.2	<0.2	<0.2		<0.2	<0.2	<0.2		<0.2		<0.2	<0.2	<0.2	<0.2	<0.2		
Endosulfan sulphate	mg/kg	0.1									<0.1	<0.1				<0.1	<0.1			<0.1	<0.1	<0.1			<0.1	<0.1	<0.1		<0.1	<0.1	<0.1		<0.1		<0.1	<0.1	<0.1	<0.1	<0.1		
Endrin	mg/kg	0.2	100								<0.2	<0.2				<0.2	<0.2			<0.2	<0.2	<0.2			<0.2	<0.2	<0.2		<0.2	<0.2	<0.2		<0.2		<0.2	<0.2	<0.2	<0.2	<0.2		
Endrin aldehyde	mg/kg	0.1									<0.1	<0.1				<0.1	<0.1			<0.1	<0.1	<0.1			<0.1	<0.1	<0.1		<0.1	<0.1	<0.1		<0.1		<0.1	<0.1	<0.1	<0.1	<0.1		
Endrin ketone	mg/kg	0.1									<0.1	<0.1				<0.1	<0.1			<0.1	<0.1	<0.1			<0.1	<0.1	<0.1		<0.1	<0.1	<0.1		<0.1		<0.1	<0.1	<0.1	<0.1	<0.1		
gamma-Chlordane	mg/kg	0.1									<0.1	<0.1				<0.1	<0.1			<0.1	<0.1	<0.1			<0.1	<0.1	<0.1		<0.1	<0.1	<0.1		<0.1		<0.1	<0.1	<0.1	<0.1	<0.1		
g-BHC (Lindane)	mg/kg	0.1									<0.1	<0.1				<0.1	<0.1			<0.1	<0.1	<0.1			<0.1	<0.1	<0.1		<0.1	<0.1	<0.1		<0.1		<0.1	<0.1	<0.1	<0.1	<0.1		
Heptachlor	mg/kg	0.1	50								<0.1	<0.1				<0.1	<0.1			<0.1	<0.1	<0.1			<0.1	<0.1	<0.1		<0.1	<0.1	<0.1		<0.1		<0.1	<0.1	<0.1	<0.1	<0.1		
Heptachlor epoxide	mg/kg	0.1									<0.1	<0.1				<0.1	<0.1			<0.1	<0.1	<0.1			<0.1	<0.1	<0.1		<0.1	<0.1	<0.1		<0.1		<0.1	<0.1	<0.1	<0.1	<0.1		
Methoxychlor	mg/kg	0.1	2,500								<0.1	<0.1				<0.1	<0.1			<0.1	<0.1	<0.1			<0.1	<0.1	<0.1		<0.1	<0.1	<0.1		<0.1		<0.1	<0.1	<0.1	<0.1	<0.1		
o,p-DDD	mg/kg	0.1									<0.1	<0.1				<0.1	<0.1			<0.1	<0.1	<0.1			<0.1	<0.1	<0.1		<0.1	<0.1	<0.1		<0.1		<0.1	<0.1	<0.1	<0.1	<0.1		
o,p'-DDE	mg/kg	0.1									<0.1	<0.1				<0.1	<0.1			<0.1	<0.1	<0.1			<0.1	<0.1	<0.1		<0.1	<0.1	<0.1		<0.1		<0.1	<0.1	<0.1	<0.1	<0.1		
trans-Nonachlor	mg/kg	0.1									<0.1	<0.1				<0.1	<0.1			<0.1	<0.1	<0.1			<0.1	<0.1	<0.1		<0.1	<0.1	<0.1		<0.1		<0.1	<0.1	<0.1	<0.1	<0.1		
Organophosphorous Pesticides																																									
Azinophos methyl	mg/kg	0.2									<0.2	<0.2				<0.2	<0.2			<0.2	<0.2	<0.2			<0.2	<0.2	<0.2		<0.2	<0.2	<0.2		<0.2		<0.2	<0.2	<0.2	<0.2	<0.2		
Bromophos-ethyl	mg/kg	0.2									<0.2	<0.2				<0.2	<0.2			<0.2	<0.2	<0.2			<0.2	<0.2	<0.2		<0.2	<0.2	<0.2		<0.2		<0.2	<0.2	<0.2	<0.2	<0.2		
Chlorpyrifos	mg/kg	0.2	2,000								<0.2	<0.2				<0.2	<0.2			<0.2	<0.2	<0.2			<0.2	<0.2	<0.2		<0.2	<0.2	<0.2		<0.2		<0.2	<0.2	<0.2	<0.2	<0.2		
Diazinon	mg/kg	0.5									<0.5	<0.5				<0.5	<0.5			<0.5	<0.5	<0.5			<0.5	<0.5	<0.5		<0.5	<0.5	<0.5		<0.5		<0.5	<0.5	<0.5	<0.5	<0.5		
Dichlorvos	mg/kg	0.5									<0.5	<0.5				<0.5	<0.5			<0.5	<0.5	<0.5			<0.5	<0.5	<0.5		<0.5	<0.5	<0.5		<0.5		<0.5	<0.5	<0.5	<0.5	<0.5		
Dimethoate	mg/kg	0.5									<0.5	<0.5				<0.5	<0.5			<0.5	<0.5	<0.5			<0.5	<0.5	<0.5		<0.5	<0.5	<0.5		<0.5		<0.5	<0.5	<0.5	<0.5	<0.5		
Ethion	mg/kg	0.2									<0.2	<0.2				<0.2	<0.2			<0.2	<0.2	<0.2			<0.2	<0.2	<0.2		<0.2	<0.2	<0.2		<0.2		<0.2	<0.2	<0.2	<0.2	<0.2		
Fenitrothion	mg/kg	0.2									<0.2	<0.2				<0.2	<0.2			<0.2	<0.2	<0.2			<0.2	<0.2	<0.2		<0.2	<0.2	<0.2		<0.2		<0.2	<0.2	<0.2	<0.2	<0.2		
Malathion	mg/kg	0.2									<0.2	<0.2				<0.2	<0.2			<0.2	<0.2	<0.2			<0.2	<0.2	<0.2		<0.2	<0.2	<0.2		<0.2		<0.2	<0.2	<0.2	<0.2	<0.2		
Methidathion	mg/kg	0.5									<0.5	<0.5				<0.5	<0.5			<0.5	<0.5	<0.5			<0.5	<0.5	<0.5		<0.5	<0.5	<0.5		<0.5		<0.5	<0.5	<0.5	<0.5	<0.5		
Other																																									
Estimated Fibres	mg/kg	100								<100	<100					<100				<100	<100			<100	<100		<100		<100				<100		<100	<100		<100			
PAH																																									
Naphthalene	mg/kg	0.1								<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1		<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
1-Methylnaphthalene	mg/kg	0.1									<0.1	<0.1				<0.1	<0.1			<0.1	<0.1	<0.1			<0.1	<0.1	<0.1		<0.1	<0.1	<0.1		<0.1		<0.1	<0.1	<0.1	<0.1	<0.1		
2-methylnaphthalene	mg/kg	0.1									<0.1	<0.1				<0.1	<0.1			<0.1	<0.1	<0.1			<0.1	<0.1	<0.1		<0.1	<0.1	<0.1		<0.1		<0.1	<0.1	<0.1	<0.1	<0.1		
Acenaphthene	mg/kg	0.1									<0.1	<0.1				<0.1	<0.1			<0.1	<0.1	<0.1			<0.1	<0.1	<0.1		<0.1	<0.1	<0.1		<0.1		<0.1	<0.1	<0.1	<0.1	<0.1		
Acenaphthylene	mg/kg	0.1									<0.1	<0.1				<0.1	<0.1			<0.1	<0.1	<0.1			<0.1	0.3	<0.1		<0.1	<0.1	<0.1		<0.1		<0.1	<0.1	<0.1	<0.1	<0.1		
Anthracene	mg/kg	0.1									<0.1	<0.1				<0.1	<0.1			<0.1	<0.1	<0.1			<0.1	<0.1	<0.1		<0.1	<0.1	<0.1		<0.1		<0.1	<0.1	<0.1	<0.1	<0.1		
Benz(a)anthracene	mg/kg	0.1									<0.1	<0.1				<0.1	<0.1			<0.1	<0.1	<0.1			<0.1	0.2	<0.1		<0.1	<0.1	<0.1		<0.1		<0.1	<0.1	<0.1	0.1	<0.1		
Benzo(a) pyrene	mg/kg	0.1	40								<0.1	<0.1				<0.1	<0.1			<0.1	<0.1	<0.1			<0.1	0.3	<0.1		<0.1	<0.1	<0.1		<0.1		<0.1	<0.1	<0.1	0.1	<0.1		
Benzo(a)pyrene TEQ (LOR)	mg/kg	0.3	40								<0.3	<0.3				<0.3	<0.3			<0.3	<0.3	<0.3			<0.3	0.5	<0.3		<0.3	<0.3	<0.3		<0.3		<0.3	<0.3	<0.3	<0.3	<0.3		
Benzo(a)pyrene TEQ calc (Half)	mg/kg	0.2	40								<0.2	<0.2				<0.2	<0.2			<0.2	<0.2	<0.2			<0.2	0.4	<0.2		<0.2	<0.2	<0.2		<0.2		<0.2	<0.2	<0.2	0.2	<0.2		
Benzo(a)pyrene TEQ calc (Zero)	mg/kg	0.2									<0.2	<0.2				<0.2	<0.2			<0.2	<0.2	<0.2			<0.2	0.4	<0.2		<0.2	<0.2	<0.2		<0.2		<0.2	<0.2	<0.2	<0.2	<0.2		
Benzo(b+j)fluoranthene	mg/kg	0.1									<0.1	<0.1				<0.1	<0.1			<0.1	<0.1	<0.1			<0.1	0.3	<0.1		<0.1	<0.1	<0.1		<0.1		<0.1	<0.1	<0.1	0.1	<0.1		
Benzo(g,h,i)perylene	mg/kg	0.1									<0.1	<0.1				<0.1	<0.1			<0.1	<0.1	<0.1			<0.1	0.3	<0.1		<0.1	<0.1	<0.1		<0.1		<0.1	<0.1	<0.1	0.1	<0.1		
Benzo(k)fluoranthene	mg/kg	0.1									<0.1	<0.1				<0.1	<0.1			<0.1	<0.1	<0.1			<0.1	0.1	<0.1		<0.1	<0.1	<0.1		<0.1		<0.1	<0.1	<0.1	<0.1	<0.1		
Chrysene	mg/kg	0.1									<0.1	<0.1				<0.1	<0.1			<0.1	<0.1	<0.1			<0.1	0.3	<0.1		<0.1	<0.1	<0.1		<0.1		<0.1	<0.1	<0.1	<0.1	<0.1		
Dibenz(a,h)anthracene	mg/kg	0.1									<0.1	<0.1				<0.1	<0.1			<0.1	<0.1	<0.1			<0.1	<0.1	<0.1		<0.1	<0.1	<0.1		<0.1		<0.1	<0.1	<0.1	<0.1	<0.1		
Fluoranthene	mg/kg	0.1									<0.1	<0.1				<0.1	<0.1			<0.1	<0.1	<0.1			<0.1	0.2	<0.1		<0.1	<0.1	0.2		<0.1		<0.1	<0.1	<0.1	0.3	<0.1		
Fluorene	mg/kg	0.1									<0.1	<0.1				<0.1	<0.1			<0.1	<0.1	<0.1			<0.1	<0.1	<0.1		<0.1	<0.1	<0.1		<0.1		<0.1	<0.1	<0.1	<0.1	<0.1		
Indeno(1,2,3-c,d)pyrene	mg/kg	0.1									<0.1	<0.1				<0.1	<0.1			<0.1	<0.1	<0.1			<0.1	0.2	<0.1		<0.1	<0.1	<0.1		<0.1		<0.1	<0.1	<0.1	0.1	<0.1		
PAHs (Sum of positives)	mg/kg	0.8			370						<0.8	<0.8				<0.8	<0.8			<0.8	<0.8	<0.8			<0.8	2.5	<0.8		<0.8	<0.8	<0.8		<0.8		<0.8	<0.8	<0.8	1.2	<0.8		
PAHs (Sum of total)	mg/kg	0.8									<0.8	<0.8				<0.8	<0.8			<0.8	<0.8	<0.8			<0.8	2.5	<0.8		<0.8	<0.8	<0.8		<0.8		<0.8	<0.8	<0.8	1.2	<0.8		
Phenanthrene	mg/kg	0.1	4,000								<0.1	<0.1				<0.1	<0.1			<0.1	<0.1	<0.1			<0.1	0.1	<0.1		<0.1	<0.1	<0.1		<0.1		<0.1	<0.1	<0.1	<0.1	<0.1		
Pyrene	mg/kg	0.1									<0.1	<0.1				<0.1	<0.1			<0.1	<0.1	<0.1			<0.1	0.2	<0.1		<0.1	<0.1	0.2		<0.1		<0.1	<0.1	<0.1	0.3	<0.1		
PCBs																																									
Arochlor 1016	mg/kg	0.2									<0.2	<0.2				<0.2	<0.2			<0.2	<0.2	<0.2			<0.2	<0.2	<0.2		<0.2	<0.2	<0.2		<0.2		<0.2	<0.2	<0.2	<0.2	<0.2		
Arochlor 1221	mg/kg	0.2									<0.2	<0.2				<0.2	<0.2			<0.2	<0.2	<0.2			<0.2	<0.2	<0.2		<0.2	<0.2	<0.2		<0.2		<0.2	<0.2	<0.2	<0.2	<0.2		
Arochlor 1232	mg/kg	0.2									<0.2	<0.2				<0.2	<0.2			<0.2	<0.2	<0.2			<0.2	<0.2	<0.2		<0.2	<0.2	<0.2		<0.2		<0.2	<0.2	<0.2	<0.2	<0.2		
Arochlor 1242	mg/kg	0.2									<0.2	<0.2				<0.2	<0.2			<0.2	<0.2	<0.2			<0.2	<0.2	<0.2		<0.2	<0.2	<0.2		<0.2		<0.2	<0.2	<0.2	<0.2	<0.2		
Arochlor 1248	mg/kg	0.2									<0.2	<0.2				<0.2	<0.2			<0.2	<0.2	<0.2			<0.2	<0.2	<0.2		<0.2	<0.2	<0.2		<0.2		<0.2	<0.2	<0.2	<0.2	<0.2		
Arochlor 1254	mg/kg	0.2									<0.2	<0.2				1.5	<0.2			<0.2	<0.2	<0.2			<0.2	<0.2	<0.2		<0.2	<0.2	<0.2		<0.2		<0.2	<0.2	<0.2	<0.2	<0.2		
Arochlor 1260	mg/kg	0.2									<0.2	<0.2				<0.2	<0.2			<0.2	<0.2	<0.2			<0.2	<0.2	<0.2		<0.2	<0.2	<0.2		<0.2		<0.2	<0.2	<0.2	<0.2	<0.2		
Arochlor 1268	mg/kg	0.2									<0.2	<0.2				<0.2	<0.2			<0.2	<0.2	<0.2			<0.2	<0.2	<0.2		<0.2	<0.2	<0.2		<0.2		<0.2	<0.2	<0.2	<0.2	<0.2		
Aroclor 1262	mg/kg	0.2									<0.2	<0.2				<0.2	<0.2			<0.2	<0.2	<0.2			<0.2	<0.2	<0.2		<0.2	<0.2	<0.2		<0.2		<0.2	<0.2	<0.2	<0.2	<0.2		
PCBs (Sum of total)	mg/kg	1									<1	<1				2	<1			<1	<1	<1			<1	<1	<1		<1	<1	<1		<1		<1	<1	<1	<1	<1		
Pesticides			7																																						
Isodrin	mg/kg	0.1									<0.1	<0.1				<0.1	<0.1			<0.1	<0.1	<0.1			<0.1	<0.1	<0.1		<0.1	<0.1	<0.1		<0.1		<0.1	<0.1	<0.1	<0.1	<0.1		
Mirex	mg/kg	0.1	100								<0.1	<0.1				<0.1	<0.1			<0.1	<0.1	<0.1			<0.1	<0.1	<0.1		<0.1	<0.1	<0.1		<0.1		<0.1	<0.1	<0.1	<0.1	<0.1		
Parathion	mg/kg	0.2									<0.2	<0.2				<0.2	<0.2			<0.2	<0.2	<0.2			<0.2	<0.2	<0.2		<0.2	<0.2	<0.2		<0.2		<0.2	<0.2	<0.2	<0.2	<0.2		
TPH																																									
+C10-C36 (Sum of total)	mg/kg	110								<110	<110	<110	<110	<110	<110	440	<110	<110	<110	<110	<110	<110	<110	220	<110	<110	<110	<110	<110	<110	<110		<110	<110	<110	<110	<110	<110	<110	170	<110
C15-C28	mg/kg	45								<45	<45	<45	<45	<45	<45	120	<45	<45	<45	<45	<45	<45	<45	64	<45	<45	<45	<45	<45	<45	<45		<45	<45	<45	<45	<45	<45	<45	<45	<45
C10-C14	mg/kg	20								<20	<20	<20	<20	<20	<20	<20	<20	<20	<20	<20	<20	<20	<20	<20	<20	<20	<20	<20	<20	<20	<20		<20	<20	<20	<20	<20	<20	<20	<20	<20
C29-C36	mg/kg	45								72	<45	<45	<45	81	<45	320	<45	58	<45	<45	<45	<45	56	160	54	<45	<45	<45	<45	<45	79		<45	53	<45	<45	<45	<45	<45	170	62
C6-C9	mg/kg	20								<20	<20	<20	<20	<20	<20	<20	<20	<20	<20	<20	<20	<20	<20	<20	<20	<20	<20	<20	<20	<20	<20		<20	<20	<20	<20	<20	<20	<20	<20	<20
TRH C37-C40	µg/kg	100,000								<100,000	<100,000	<100,000	<100,000	<100,000	<100,000	<100,000	<100,000	<100,000	<100,000	<100,000	<100,000	<100,000	<100,000	<100,000	<100,000	<100,000	<100,000	<100,000	<100,000	<100,000	<100,000		<100,000	<100,000	<100,000	<100,000	<100,000	<100,000	<100,000	<100,000	<100,000

Annexure E

Laboratory reports

QA/QC Compliance Assessment to assist with Quality Review

Work Order	: **CA1903638**	Page	: 1 of 4
Amendment	: **1**		
Client	: **EMM Consulting**	Laboratory	: ALS Water Resources Group
Contact	: Claire Corthier	Telephone	: +61 2 6202 5404
Project	: J17188 - EIS Polo Flat	Date Samples Received	: 04-Jun-2019
Site	: J17188 - EIS Polo Flat	Issue Date	: 08-Aug-2019
Sampler	: Claire Corthier	No. of samples received	: 7
Order number	:	No. of samples analysed	: 7

This report is automatically generated by the ALS LIMS through interpretation of the ALS Quality Control Report and several Quality Assurance parameters measured by ALS. This automated reporting highlights any non-conformances, facilitates faster and more accurate data validation and is designed to assist internal expert and external Auditor review. Many components of this report contribute to the overall DQO assessment and reporting for guideline compliance.

Brief method summaries and references are also provided to assist in traceability.

Summary of Outliers

Outliers : Quality Control Samples

This report highlights outliers flagged in the Quality Control (QC) Report.

- **NO Method Blank value outliers occur.**
- **NO Duplicate outliers occur.**
- **NO Laboratory Control outliers occur.**
- **NO Matrix Spike outliers occur.**
- **For all regular sample matrices, NO surrogate recovery outliers occur.**

Outliers : Analysis Holding Time Compliance

- **Analysis Holding Time Outliers exist - please see following pages for full details.**

Outliers : Frequency of Quality Control Samples

- **Quality Control Sample Frequency Outliers exist - please see following pages for full details.**

Outliers : Analysis Holding Time Compliance

Matrix: **WATER**

Method	*Extraction / Preparation*			*Analysis*		
Container / Client Sample ID(s)	*Date extracted*	*Due for extraction*	***Days overdue***	*Date analysed*	*Due for analysis*	***Days overdue***
EA005CA: pH						
Chem	----	----	----	11-Jun-2019	31-May-2019	**11**

Outliers : Frequency of Quality Control Samples

Matrix: **WATER**

Quality Control Sample Type	Count		Rate (%)		Quality Control Specification
Method	QC	Regular	Actual	Expected	
Laboratory Duplicates (DUP)					
pH	1	15	6.67	10.00	NEPM 2013 B3 & ALS QC Standard
Laboratory Control Samples (LCS)					
pH	2	15	13.33	15.00	NEPM 2013 B3 & ALS QC Standard

Analysis Holding Time Compliance

If samples are identified below as having been analysed or extracted outside of recommended holding times, this should be taken into consideration when interpreting results.

This report summarizes extraction / preparation and analysis times and compares each with ALS recommended holding times (referencing USEPA SW 846, APHA, AS and NEPM) based on the sample container provided. Dates reported represent first date of extraction or analysis and preclude subsequent dilutions and reruns. A listing of breaches (if any) is provided herein.

Holding time for leachate methods (e.g. TCLP) vary according to the analytes reported. Assessment compares the leach date with the shortest analyte holding time for the equivalent soil method. These are: organics 14 days, mercury 28 days & other metals 180 days. A recorded breach does not guarantee a breach for all non-volatile parameters.

Holding times for ***VOC in soils*** vary according to analytes of interest. Vinyl Chloride and Styrene holding time is 7 days; others 14 days. A recorded breach does not guarantee a breach for all VOC analytes and should be verified in case the reported breach is a false positive or Vinyl Chloride and Styrene are not key analytes of interest/concern.

Matrix: **WATER**

Evaluation: × = Holding time breach ; ✓ = Within holding time.

Method	***Sample Date***	*Extraction / Preparation*			*Analysis*		
Container */ Client Sample ID(s)*		***Date extracted***	*Due for extraction*	*Evaluation*	***Date analysed***	*Due for analysis*	*Evaluation*
EA005CA: pH							
Chem (EA005)	**31-May-2019**	**----**	----	----	**11-Jun-2019**	31-May-2019	×
EA010CA: Conductivity							
Chem (EA010)	**31-May-2019**	**----**	----	----	**11-Jun-2019**	----	----
EA015CA: Total Dissolved Solids							
TDS (EA015H)	**31-May-2019**	**----**	----	----	**13-Jun-2019**	----	----
EG005CA: Total Metals by ICP-OES							
Tot. Metal (EG005T)	**31-May-2019**	**17-Jun-2019**	----	----	**17-Jun-2019**	----	----
EG020CA: Total Metals by ICP-MS							
Tot. Metal (EG020C-T)	**31-May-2019**	**17-Jun-2019**	----	----	**18-Jun-2019**	----	----

Quality Control Parameter Frequency Compliance

The following report summarises the frequency of laboratory QC samples analysed within the analytical lot(s) in which the submitted sample(s) was(were) processed. Actual rate should be greater than or equal to the expected rate. A listing of breaches is provided in the Summary of Outliers.

Matrix: **WATER**

Evaluation: ✗ = Quality Control frequency not within specification ; ✓ = Quality Control frequency within specification.

Quality Control Sample Type		Count		Rate (%)			Quality Control Specification
Analytical Methods	*Method*	*QC*	*Regular*	***Actual***	***Expected***	*Evaluation*	
Laboratory Duplicates (DUP)							
Conductivity	EA010	2	13	**15.38**	**10.00**	✓	NEPM 2013 B3 & ALS QC Standard
pH	EA005	1	15	**6.67**	**10.00**	✗	NEPM 2013 B3 & ALS QC Standard
Total Dissolved Solids (High Level)	EA015H	2	19	**10.53**	**10.00**	✓	NEPM 2013 B3 & ALS QC Standard
Total Metals by ICP-MS - Suite C	EG020C-T	2	20	**10.00**	**10.00**	✓	NEPM 2013 B3 & ALS QC Standard
Total Metals by ICP-OES	EG005T	2	20	**10.00**	**10.00**	✓	NEPM 2013 B3 & ALS QC Standard
Laboratory Control Samples (LCS)							
Conductivity	EA010	2	13	**15.38**	**10.00**	✓	NEPM 2013 B3 & ALS QC Standard
pH	EA005	2	15	**13.33**	**15.00**	✗	NEPM 2013 B3 & ALS QC Standard
Total Dissolved Solids (High Level)	EA015H	2	19	**10.53**	**10.00**	✓	NEPM 2013 B3 & ALS QC Standard
Total Metals by ICP-MS - Suite C	EG020C-T	1	20	**5.00**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Total Metals by ICP-OES	EG005T	2	20	**10.00**	**10.00**	✓	NEPM 2013 B3 & ALS QC Standard
Method Blanks (MB)							
Conductivity	EA010	1	13	**7.69**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Total Dissolved Solids (High Level)	EA015H	1	19	**5.26**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Total Metals by ICP-MS - Suite C	EG020C-T	1	20	**5.00**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Total Metals by ICP-OES	EG005T	1	20	**5.00**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Matrix Spikes (MS)							
Total Metals by ICP-MS - Suite C	EG020C-T	1	20	**5.00**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Total Metals by ICP-OES	EG005T	1	20	**5.00**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard

Brief Method Summaries

The analytical procedures used by the Environmental Division have been developed from established internationally recognized procedures such as those published by the US EPA, APHA, AS and NEPM. In house developed procedures are employed in the absence of documented standards or by client request. The following report provides brief descriptions of the analytical procedures employed for results reported in the Certificate of Analysis. Sources from which ALS methods have been developed are provided within the Method Descriptions.

Analytical Methods	*Method*	*Matrix*	*Method Descriptions*
pH	EA005	WATER	APHA 21st ed. 4500 H+ B. pH of water samples is determined by ISE either manually or by automated pH meter. This method is compliant with NEPM (2013) Schedule B(3)
Conductivity	EA010	WATER	APHA 21st ed., 2510 B This procedure determines conductivity by automated ISE. This method is compliant with NEPM (2013) Schedule B(3)
Total Dissolved Solids (High Level)	EA015H	WATER	In-House, APHA 21st ed., 2540C A gravimetric procedure that determines the amount of `filterable` residue in an aqueous sample. A well-mixed sample is filtered through a glass fibre filter (1.2um). The filtrate is evaporated to dryness and dried to constant weight at 180+/-5C. This method is compliant with NEPM (2013) Schedule B(3)
Asbestos Identification in Water - Performed at ALS Newcastl	* EA200W	WATER	Analysis by filtration, sample reduction and asbestos identification by AS 4964 - 2004 Method for the qualitative identification of asbestos in bulk samples. NATA accreditation does not cover performance of this analysis.
Total Metals by ICP-OES	EG005T	WATER	USEPA 200.7. The ICP-OES technique ionises the sample atoms emitting a characteristic spectrum. This spectrum is then compared against matrix matched standards for quantification.
Total Metals by ICP-MS - Suite C	EG020C-T	WATER	USEPA 200.8. The ICPMS technique utilizes a highly efficient argon plasma to ionize selected elements. Ions are then passed into a high vacuum mass spectrometer, which separates the analytes based on their distinct mass to charge ratios prior to their measurement by a discrete dynode ion detector.
Polychlorinated Biphenyls (PCB) - Performed at ALS Sydney	EP066	WATER	USEPA SW 846 - 8270D Sample extracts are analysed by Capillary GC/MS and quantification is by comparison against an established 5 point calibration curve. This method is compliant with NEPM (2013) Schedule B(3)
Pesticides by GCMS - Performed at ALS Sydney	EP068	WATER	USEPA SW 846 - 8270D Sample extracts are analysed by Capillary GC/MS and quantification is by comparison against an established 5 point calibration curve. This method is compliant with NEPM (2013) Schedule B(3)
TPH - Semivolatile Fraction - Performed at ALS Sydney	EP071	WATER	USEPA SW 846 - 8015A The sample extract is analysed by Capillary GC/FID and quantification is by comparison against an established 5 point calibration curve of n-Alkane standards. This method is compliant with NEPM (2013) Schedule B(3)
PAH (GC/MS - SIM) - Performed at ALS Sydney	EP075 (SIM)	WATER	USEPA SW 846 - 8270D Sample extracts are analysed by Capillary GC/MS in SIM Mode and quantification is by comparison against an established 5 point calibration curve. This method is compliant with NEPM (2013) Schedule B(3)
TPH Volatiles/BTEX - Performed at ALS Sydney	EP080	WATER	USEPA SW 846 - 8260B Water samples are directly purged prior to analysis by Capillary GC/MS and quantification is by comparison against an established 5 point calibration curve. Alternatively, a sample is equilibrated in a headspace vial and a portion of the headspace determined by GCMS analysis. This method is compliant with NEPM (2013) Schedule B(3)
Per- and Polyfluoroalkyl Substances (PFAS) by LCMSMS	EP231-X	WATER	In house: Direct injection analysis of fresh waters after dilution (1:1) with methanol. Analysis by LC-Electrospray-MS-MS, Negative Mode using MRM.

Preparation Methods	*Method*	*Matrix*	*Method Descriptions*
Total Metals Sample Preparation	EN25	WATER	Total Metals Sample Preparation

QUALITY CONTROL REPORT

Work Order : **CA1903638**
Amendment : **1**

Client : **EMM Consulting**
Contact : Claire Corthier
Address :
St Leonards NSW 2065
Telephone : 02 9493 9500
Project : J17188 - EIS Polo Flat
Order number :
C-O-C number : ----
Sampler : Claire Corthier
Site : J17188 - EIS Polo Flat
Quote number : ----
No. of samples received : 7
No. of samples analysed : 7

Page : 1 of 5

Laboratory : ALS Water Resources Group
Contact : Client Services
Address : 16B Lithgow Street Fyshwick ACT Australia 2609
Telephone : +61 2 6202 5404
Date Samples Received : 04-Jun-2019
Date Analysis Commenced : 11-Jun-2019
Issue Date : 08-Aug-2019

Accreditation No. 992
Accredited for compliance with
ISO/IEC 17025 - Testing

This report supersedes any previous report(s) with this reference. Results apply to the sample(s) as submitted. This document shall not be reproduced, except in full.

This Quality Control Report contains the following information:

- Laboratory Duplicate (DUP) Report; Relative Percentage Difference (RPD) and Acceptance Limits
- Method Blank (MB) and Laboratory Control Spike (LCS) Report; Recovery and Acceptance Limits
- Matrix Spike (MS) Report; Recovery and Acceptance Limits

Signatories

This document has been electronically signed by the authorized signatories below. Electronic signing is carried out in compliance with procedures specified in 21 CFR Part 11.

Signatories	*Position*	*Accreditation Category*
Geetha Ramasundara	Chemistry Teamleader	Inorganics, Fyshwick, ACT
Teresa Rand	Client Services	ALS Environmental, Fyshwick, ACT
Titus Vimalasiri	Metals Teamleader	Inorganics, Fyshwick, ACT

General Comments

The analytical procedures used by the Environmental Division have been developed from established internationally recognized procedures such as those published by the USEPA, APHA, AS and NEPM. In house developed procedures are employed in the absence of documented standards or by client request.

Where moisture determination has been performed, results are reported on a dry weight basis.

Where a reported less than (<) result is higher than the LOR, this may be due to primary sample extract/digestate dilution and/or insufficient sample for analysis. Where the LOR of a reported result differs from standard LOR, this may be due to high

Key : Anonymous = Refers to samples which are not specifically part of this work order but formed part of the QC process lot
CAS Number = CAS registry number from database maintained by Chemical Abstracts Services. The Chemical Abstracts Service is a division of the American Chemical Society.
LOR = Limit of reporting
RPD = Relative Percentage Difference
# = Indicates failed QC

Laboratory Duplicate (DUP) Report

The quality control term Laboratory Duplicate refers to a randomly selected intralaboratory split. Laboratory duplicates provide information regarding method precision and sample heterogeneity. The permitted ranges for the Relative Percent Deviation (RPD) of Laboratory Duplicates are specified in ALS Method QWI-EN/38 and are dependent on the magnitude of results in comparison to the level of reporting: Result < 10 times LOR: No Limit; Result between 10 and 20 times LOR: 0% - 50%; Result > 20 times LOR: 0% - 20%.

Sub-Matrix: **WATER**

				Laboratory Duplicate (DUP) Report					
Laboratory sample ID	*Client sample ID*	*Method: Compound*	*CAS Number*	*LOR*	*Unit*	*Original Result*	*Duplicate Result*	*RPD (%)*	*Recovery Limits (%)*
EA005CA: pH (QC Lot: 2397091)									
CA1903638-001	MB01	EA005: pH	----	0.01	pH Unit	7.56	7.59	0.301	0% - 20%
EA010CA: Conductivity (QC Lot: 2397092)									
CA1903799-003	Anonymous	EA010: Electrical Conductivity @ 25°C	----	2	µS/cm	836	836	0.00	0% - 20%
CA1903638-001	MB01	EA010: Electrical Conductivity @ 25°C	----	2	µS/cm	1080	1080	0.00	0% - 20%
EA015CA: Total Dissolved Solids (QC Lot: 2403339)									
CA1903442-001	Anonymous	EA015H: Total Dissolved Solids	----	10	mg/L	60	71	16.8	No Limit
CA1903698-003	Anonymous	EA015H: Total Dissolved Solids	----	10	mg/L	905	895	1.11	0% - 20%
EG005CA: Total Metals by ICP-OES (QC Lot: 2407455)									
CA1903218-018	Anonymous	EG005T: Iron	7439-89-6	0.01	mg/L	0.48	0.48	0.00	0% - 20%
CA1903454-001	Anonymous	EG005T: Iron	7439-89-6	0.01	mg/L	0.01	0.01	0.00	No Limit
EG020CA: Total Metals by ICP-MS (QC Lot: 2407456)									
CA1903638-001	MB01	EG020C-T: Cadmium	7440-43-9	0.05	µg/L	<0.05	<0.05	0.00	No Limit
		EG020C-T: Beryllium	7440-41-7	0.1	µg/L	0.9	0.9	0.00	No Limit
		EG020C-T: Cobalt	7440-48-4	0.2	µg/L	40.2	42.3	4.97	0% - 20%
		EG020C-T: Lead	7439-92-1	0.2	µg/L	6.5	6.5	0.00	0% - 20%
		EG020C-T: Barium	7440-39-3	0.5	µg/L	79.3	77.9	1.76	0% - 20%
		EG020C-T: Manganese	7439-96-5	0.5	µg/L	883	921	4.24	0% - 20%
		EG020C-T: Arsenic	7440-38-2	1	µg/L	1	2	0.00	No Limit
		EG020C-T: Copper	7440-50-8	1	µg/L	37	38	3.50	0% - 20%
		EG020C-T: Molybdenum	7439-98-7	1	µg/L	<1	<1	0.00	No Limit
		EG020C-T: Nickel	7440-02-0	1	µg/L	130	135	3.98	0% - 20%
		EG020C-T: Selenium	7782-49-2	1	µg/L	2	7	95.2	No Limit
		EG020C-T: Silver	7440-22-4	1	µg/L	<1	<1	0.00	No Limit
		EG020C-T: Chromium	7440-47-3	2	µg/L	53	55	3.42	0% - 20%

Sub-Matrix: **WATER**

Laboratory sample ID	Client sample ID	Method: Compound	CAS Number	LOR	Unit	Original Result	Duplicate Result	RPD (%)	Recovery Limits (%)
				Laboratory Duplicate (DUP) Report					
EG020CA: Total Metals by ICP-MS (QC Lot: 2407456) - continued									
CA1903638-001	MB01	EG020C-T: Antimony	7440-36-0	3	µg/L	<3	<3	0.00	No Limit
		EG020C-T: Zinc	7440-66-6	5	µg/L	70	74	4.56	0% - 50%
		EG020C-T: Aluminium	7429-90-5	9	µg/L	33700	35400	4.87	0% - 20%
CA1903802-003	Anonymous	EG020C-T: Cadmium	7440-43-9	0.05	µg/L	<0.05	<0.05	0.00	No Limit
		EG020C-T: Beryllium	7440-41-7	0.1	µg/L	<0.1	<0.1	0.00	No Limit
		EG020C-T: Cobalt	7440-48-4	0.2	µg/L	<0.2	<0.2	0.00	No Limit
		EG020C-T: Lead	7439-92-1	0.2	µg/L	0.4	0.4	0.00	No Limit
		EG020C-T: Barium	7440-39-3	0.5	µg/L	27.0	26.8	0.534	0% - 20%
		EG020C-T: Manganese	7439-96-5	0.5	µg/L	5.2	5.2	0.00	0% - 50%
		EG020C-T: Arsenic	7440-38-2	1	µg/L	<1	<1	0.00	No Limit
		EG020C-T: Copper	7440-50-8	1	µg/L	4	4	0.00	No Limit
		EG020C-T: Molybdenum	7439-98-7	1	µg/L	<1	<1	0.00	No Limit
		EG020C-T: Nickel	7440-02-0	1	µg/L	2	2	0.00	No Limit
		EG020C-T: Selenium	7782-49-2	1	µg/L	<1	<1	0.00	No Limit
		EG020C-T: Silver	7440-22-4	1	µg/L	<1	<1	0.00	No Limit
		EG020C-T: Chromium	7440-47-3	2	µg/L	2	2	0.00	No Limit
		EG020C-T: Antimony	7440-36-0	3	µg/L	<3	<3	0.00	No Limit
		EG020C-T: Zinc	7440-66-6	5	µg/L	<5	<5	0.00	No Limit
		EG020C-T: Aluminium	7429-90-5	9	µg/L	613	609	0.659	0% - 20%

Method Blank (MB) and Laboratory Control Spike (LCS) Report

The quality control term Method / Laboratory Blank refers to an analyte free matrix to which all reagents are added in the same volumes or proportions as used in standard sample preparation. The purpose of this QC parameter is to monitor potential laboratory contamination. The quality control term Laboratory Control Spike (LCS) refers to a certified reference material, or a known interference free matrix spiked with target analytes. The purpose of this QC parameter is to monitor method precision and accuracy independent of sample matrix. Dynamic Recovery Limits are based on statistical evaluation of processed LCS.

Sub-Matrix: **WATER**

				Method Blank (MB) Report	Laboratory Control Spike (LCS) Report			
					Spike	Spike Recovery (%)	Recovery Limits (%)	
Method: Compound	*CAS Number*	*LOR*	*Unit*	*Result*	*Concentration*	*LCS*	*Low*	*High*
EA005CA: pH (QCLot: 2397091)								
EA005: pH	----	----	pH Unit	---- ----	6 pH Unit 8 pH Unit	99.6 99.4	97 94	103 106
EA010CA: Conductivity (QCLot: 2397092)								
EA010: Electrical Conductivity @ 25°C	----	2	µS/cm	<2 <2	45 µS/cm 349 µS/cm	102 100	96 97	108 104
EA015CA: Total Dissolved Solids (QCLot: 2403339)								
EA015H: Total Dissolved Solids	----	10	mg/L	<10 <10	100 mg/L 1000 mg/L	93.0 99.4	83 95	119 105
EG005CA: Total Metals by ICP-OES (QCLot: 2407455)								
EG005T: Iron	7439-89-6	0.01	mg/L	<0.01 <0.01	1 mg/L 10 mg/L	99.6 101	91 91	106 105
EG020CA: Total Metals by ICP-MS (QCLot: 2407456)								
EG020C-T: Aluminium	7429-90-5	9	µg/L	<9	1000 µg/L	89.8	85	116
EG020C-T: Antimony	7440-36-0	3	µg/L	<3	500 µg/L	95.2	84	120
EG020C-T: Arsenic	7440-38-2	1	µg/L	<1	500 µg/L	98.0	90	111
EG020C-T: Barium	7440-39-3	0.5	µg/L	<0.5	100 µg/L	96.1	91	110
EG020C-T: Beryllium	7440-41-7	0.1	µg/L	<0.1	100 µg/L	90.6	86	117
EG020C-T: Cadmium	7440-43-9	0.05	µg/L	<0.05	100 µg/L	94.0	92	109
EG020C-T: Chromium	7440-47-3	2	µg/L	<2	500 µg/L	90.8	88	113
EG020C-T: Cobalt	7440-48-4	0.2	µg/L	<0.2	100 µg/L	98.9	89	111
EG020C-T: Copper	7440-50-8	1	µg/L	<1	100 µg/L	97.6	89	110
EG020C-T: Lead	7439-92-1	0.2	µg/L	<0.2	100 µg/L	96.1	89	112
EG020C-T: Manganese	7439-96-5	0.5	µg/L	<0.5	100 µg/L	91.2	88	112
EG020C-T: Molybdenum	7439-98-7	1	µg/L	<1	100 µg/L	95.5	88	114
EG020C-T: Nickel	7440-02-0	1	µg/L	<1	100 µg/L	98.6	89	111
EG020C-T: Selenium	7782-49-2	1	µg/L	<1	500 µg/L	91.6	90	111
EG020C-T: Silver	7440-22-4	1	µg/L	<1	100 µg/L	92.6	91	109
EG020C-T: Zinc	7440-66-6	5	µg/L	<5	500 µg/L	105	89	111

Matrix Spike (MS) Report

The quality control term Matrix Spike (MS) refers to an intralaboratory split sample spiked with a representative set of target analytes. The purpose of this QC parameter is to monitor potential matrix effects on analyte recoveries. Static Recovery Limits as per laboratory Data Quality Objectives (DQOs). Ideal recovery ranges stated may be waived in the event of sample matrix interference.

Sub-Matrix: **WATER**

Matrix Spike (MS) Report

Sub-Matrix: **WATER**

				Matrix Spike (MS) Report			
				Spike	SpikeRecovery(%)	Recovery Limits (%)	
Laboratory sample ID	*Client sample ID*	*Method: Compound*	*CAS Number*	*Concentration*	*MS*	*Low*	*High*
EG005CA: Total Metals by ICP-OES (QCLot: 2407455)							
CA1903218-019	Anonymous	EG005T: Iron	7439-89-6	10 mg/L	99.7	70	130
EG020CA: Total Metals by ICP-MS (QCLot: 2407456)							
CA1903638-002	MB02	EG020C-T: Aluminium	7429-90-5	1000 µg/L	87.7	70	130
		EG020C-T: Antimony	7440-36-0	500 µg/L	104	70	130
		EG020C-T: Arsenic	7440-38-2	500 µg/L	105	70	130
		EG020C-T: Barium	7440-39-3	100 µg/L	103	70	130
		EG020C-T: Beryllium	7440-41-7	100 µg/L	108	70	130
		EG020C-T: Cadmium	7440-43-9	100 µg/L	104	70	130
		EG020C-T: Chromium	7440-47-3	500 µg/L	106	70	130
		EG020C-T: Cobalt	7440-48-4	100 µg/L	103	70	130
		EG020C-T: Copper	7440-50-8	100 µg/L	104	70	130
		EG020C-T: Lead	7439-92-1	100 µg/L	106	70	130
		EG020C-T: Manganese	7439-96-5	100 µg/L	102	70	130
		EG020C-T: Molybdenum	7439-98-7	100 µg/L	108	70	130
		EG020C-T: Nickel	7440-02-0	100 µg/L	102	70	130
		EG020C-T: Selenium	7782-49-2	500 µg/L	105	70	130
		EG020C-T: Silver	7440-22-4	100 µg/L	101	70	130
		EG020C-T: Zinc	7440-66-6	500 µg/L	104	70	130

SAMPLE RECEIPT NOTIFICATION (SRN)

Work Order : **CA1903638**
Amendment : **2**

Client	: **EMM Consulting**	Laboratory	: ALS Water Resources Group
Contact	: Claire Corthier	Contact	: Client Services
Address	: St Leonards NSW 2065	Address	: 16B Lithgow Street Fyshwick ACT Australia 2609
E-mail	: ccorthier@emmconsulting.com.au	E-mail	: ecowisecustomerservice@alsglobal.com
Telephone	: 02 9493 9500	Telephone	: +61 2 6202 5404
Facsimile	: ----	Facsimile	: +61 2 6202 5404
Project	: J17188 - EIS Polo Flat	Page	: 1 of 3
Order number	:	Quote number	: CA2017EMMCON0001
C-O-C number	: ----	QC Level	: NEPM 2013 B3 & ALS QC Standard
Site	: J17188 - EIS Polo Flat		
Sampler	: Claire Corthier		

Dates

Date Samples Received	: 04-Jun-2019 09:00	Issue Date	: 08-Aug-2019
Client Requested Due Date	: 18-Jun-2019	Scheduled Reporting Date	: **18-Jun-2019**

Delivery Details

Mode of Delivery	: Client Drop Off	Security Seal	: Not Available
No. of coolers/boxes	: ----	Temperature	: ----
Receipt Detail	: Dropped off after hours Friday afternoon, received instructions/COC by SR Tuesday.	No. of samples received / analysed	: 7 / 7

General Comments

- This report contains the following information:
  - Summary of Sample(s) and Requested Analysis
  - Requested Deliverables

CA1903638-001	: 31-May-2019 07:50	:
CA1903638-002	: 31-May-2019 13:00	:
CA1903638-003	: 31-May-2019 11:00	:
CA1903638-004	: 31-May-2019 10:00	:
CA1903638-005	: 31-May-2019 09:00	:
CA1903638-006	: 31-May-2019 12:15	:
CA1903638-007	: 31-May-2019 14:00	:

Summary of Sample(s) and Requested Analysis

Some items described below may be part of a laboratory process necessary for the execution of client requested tasks. Packages may contain additional analyses, such as the determination of moisture content and preparation tasks, that are included in the package.

If no sampling time is provided, the sampling time will default 00:00 on the date of sampling. If no sampling date is provided, the sampling date will be assumed by the laboratory and displayed in brackets without a time component

Matrix: **WATER**

Laboratory sample ID	*Client sampling date / time*	*Client sample ID*	WATER - EA005 pH	WATER - EA010 Conductivity	WATER - EA015H Total Dissolved Solids (High Level)	WATER - EA200W Asbestos Identification in Water	WATER - EG020C-T Total Metals (Standard Suite)	WATER - EP066 Polychlorinated Biphenyls (PCB) - Performed at	WATER - EP231-X. PFAS - Standard Level (Long Suite)
CA1903638-001	31-May-2019 07:50	MB01	✓	✓	✓	✓	✓	✓	✓
CA1903638-002	31-May-2019 13:00	MB02	✓	✓	✓	✓	✓	✓	✓
CA1903638-003	31-May-2019 11:00	MB03	✓	✓	✓	✓	✓	✓	✓
CA1903638-004	31-May-2019 10:00	MB04A	✓	✓	✓	✓	✓	✓	✓
CA1903638-005	31-May-2019 09:00	MB04B	✓	✓	✓	✓	✓	✓	✓
CA1903638-006	31-May-2019 12:15	MB05	✓	✓	✓	✓	✓	✓	✓
CA1903638-007	31-May-2019 14:00	MB06	✓	✓	✓	✓	✓	✓	✓

Matrix: **WATER**

Laboratory sample ID	*Client sampling date / time*	*Client sample ID*	WATER - W-07 TRH/BTEXN/PAH	WATER - W-12 OC/OP Pesticides
CA1903638-001	31-May-2019 07:50	MB01	✓	✓
CA1903638-002	31-May-2019 13:00	MB02	✓	✓
CA1903638-003	31-May-2019 11:00	MB03	✓	✓
CA1903638-004	31-May-2019 10:00	MB04A	✓	✓
CA1903638-005	31-May-2019 09:00	MB04B	✓	✓
CA1903638-006	31-May-2019 12:15	MB05	✓	✓
CA1903638-007	31-May-2019 14:00	MB06	✓	✓

Proactive Holding Time Report

The following table summarises breaches of recommended holding times that have occurred prior to samples/instructions being received at the laboratory.

Matrix: **WATER**

Evaluation: × = Holding time breach ; ✓ = Within holding time.

Method Client Sample ID(s)	Container	Due for extraction	Due for analysis	Samples Received		Instructions Received	
				Date	Evaluation	Date	Evaluation
EA005: pH							

	Chem	----	31-May-2019	04-Jun-2019	✗	----	----
	Chem	----	31-May-2019	04-Jun-2019	✗	----	----
	Chem	----	31-May-2019	04-Jun-2019	✗	----	----
	Chem	----	31-May-2019	04-Jun-2019	✗	----	----
	Chem	----	31-May-2019	04-Jun-2019	✗	----	----
	Chem	----	31-May-2019	04-Jun-2019	✗	----	----
	Chem	----	31-May-2019	04-Jun-2019	✗	----	----

Requested Deliverables

Claire Corthier

- A4 - AU Tax Invoice (INV) Email ccorthier@emmconsulting.com.au

CERTIFICATE OF ANALYSIS

Work Order : **CA1903638**
Amendment : **1**
Client : **EMM Consulting**
Contact : Claire Corthier
Address :
St Leonards NSW 2065
Telephone : 02 9493 9500
Project : J17188 - EIS Polo Flat
Order number :
C-O-C number : ----
Sampler : Claire Corthier
Site : J17188 - EIS Polo Flat
Quote number : ----
No. of samples received : 7
No. of samples analysed : 7

Page : 1 of 12
Laboratory : ALS Water Resources Group
Contact : Client Services
Address : 16B Lithgow Street Fyshwick ACT Australia 2609
Telephone : +61 2 6202 5404
Date Samples Received : 04-Jun-2019 09:00
Date Analysis Commenced : 11-Jun-2019
Issue Date : 21-Jun-2019 12:02

Accreditation No. 992
Accredited for compliance with
ISO/IEC 17025 - Testing

This report supersedes any previous report(s) with this reference. Results apply to the sample(s) as submitted. This document shall not be reproduced, except in full.

This Certificate of Analysis contains the following information:

- General Comments
- Analytical Results

Additional information pertinent to this report will be found in the following separate attachments: Quality Control Report, QA/QC Compliance Assessment to assist with Quality Review and Sample Receipt Notification.

Signatories

This document has been electronically signed by the authorized signatories below. Electronic signing is carried out in compliance with procedures specified in 21 CFR Part 11.

Signatories	*Position*	*Accreditation Category*
Geetha Ramasundara	Chemistry Teamleader	Inorganics, Fyshwick, ACT
Teresa Rand	Client Services	ALS Environmental, Fyshwick, ACT
Titus Vimalasiri	Metals Teamleader	Inorganics, Fyshwick, ACT

General Comments

The analytical procedures used by the Environmental Division have been developed from established internationally recognized procedures such as those published by the USEPA, APHA, AS and NEPM. In house developed procedures are employed in the absence of documented standards or by client request.

Where moisture determination has been performed, results are reported on a dry weight basis.

Where a reported less than (<) result is higher than the LOR, this may be due to primary sample extract/digestate dilution and/or insufficient sample for analysis.

Where the LOR of a reported result differs from standard LOR, this may be due to high moisture content, insufficient sample (reduced weight employed) or matrix interference.

When sampling time information is not provided by the client, sampling dates are shown without a time component. In these instances, the time component has been assumed by the laboratory for processing purposes.

Where a result is required to meet compliance limits the associated uncertainty must be considered. Refer to the ALS Contact for details.

Key : CAS Number = CAS registry number from database maintained by Chemical Abstracts Services. The Chemical Abstracts Service is a division of the American Chemical Society.
LOR = Limit of reporting
^ = This result is computed from individual analyte detections at or above the level of reporting
ø = ALS is not NATA accredited for these tests.
~ = Indicates an estimated value.

- **For samples collected by ALS WRG, sampling was carried out in accordance with Procedure EN67**
- EA200W Performed at ALS Newcastle
- EP066 Performed at ALS Sydney
- EP068 Performed at ALS Sydney
- EP071 Performed at ALS Sydney
- EP075 (SIM) Performed at ALS Sydney
- EP080 Performed at ALS Sydney
- EP231-X Performed at ALS Sydney
- Result for pH in water tested in the laboratory may be indicative only as holding time is generally not achievable.

Analytical Results

Sub-Matrix: **WATER**
(Matrix: **WATER**)

Compound	CAS Number	LOR	Unit	MB01	MB02	MB03	MB04A	MB04B
Client sample ID				---- **MB01**	---- **MB02**	---- **MB03**	---- **MB04A**	---- **MB04B**
Client sampling date / time				31-May-2019 07:50	31-May-2019 13:00	31-May-2019 11:00	31-May-2019 10:00	31-May-2019 09:00
				CA1903638-001	**CA1903638-002**	**CA1903638-003**	**CA1903638-004**	**CA1903638-005**
				Result	Result	Result	Result	Result
EA200W: Asbestos in Water								
ø **Asbestos Detected**	1332-21-4	0.1	g/kg	**No**	**No**	**No**	**No**	**No**
ø **Asbestos Type**	1332-21-4	0.1	g/kg	-	-	-	-	-
ø **Description**	----	1	--	-	-	-	-	-
ø **APPROVED IDENTIFIER:**	----	1	-	**A. SMYLIE**	**A. SMYLIE**	**A. SMYLIE**	**A. SMYLIE**	**A. SMYLIE**
EA005CA: pH								
pH	----	0.01	pH Unit	**7.56**	**8.85**	**7.70**	**7.75**	**8.08**
EA010CA: Conductivity								
Electrical Conductivity @ 25°C	----	2	µS/cm	**1080**	**352**	**892**	**885**	**593**
EA015CA: Total Dissolved Solids								
Total Dissolved Solids	----	10	mg/L	**589**	**226**	**486**	**504**	**322**
EG005CA: Total Metals by ICP-OES								
Iron	7439-89-6	0.01	mg/L	**30.8**	**1.02**	**2.02**	**8.84**	**0.28**
EG020CA: Total Metals by ICP-MS								
Aluminium	7429-90-5	9	µg/L	**33700**	**1120**	**2680**	**6220**	**257**
Antimony	7440-36-0	3	µg/L	<3	<3	<3	<3	<3
Arsenic	7440-38-2	1	µg/L	**1**	<1	<1	**2**	<1
Barium	7440-39-3	0.5	µg/L	**79.3**	**4.2**	**27.4**	**153**	**22.1**
Beryllium	7440-41-7	0.1	µg/L	**0.9**	<0.1	**0.2**	**0.4**	<0.1
Cadmium	7440-43-9	0.05	µg/L	<0.05	<0.05	<0.05	**0.12**	<0.05
Chromium	7440-47-3	2	µg/L	**53**	**2**	**4**	**5**	<2
Cobalt	7440-48-4	0.2	µg/L	**40.2**	**1.0**	**3.6**	**7.8**	**0.4**
Copper	7440-50-8	1	µg/L	**37**	**2**	**4**	**8**	<1
Lead	7439-92-1	0.2	µg/L	**6.5**	<0.2	**2.0**	**7.7**	<0.2
Manganese	7439-96-5	0.5	µg/L	**883**	**16.3**	**83.2**	**1460**	**10.7**
Molybdenum	7439-98-7	1	µg/L	<1	**1**	<1	<1	**2**
Nickel	7440-02-0	1	µg/L	**130**	**5**	**15**	**10**	**3**
Selenium	7782-49-2	1	µg/L	**2**	<1	**2**	**4**	**1**
Silver	7440-22-4	1	µg/L	<1	<1	<1	<1	<1
Zinc	7440-66-6	5	µg/L	**70**	**8**	**15**	**25**	**6**
Mercury	7439-97-6	0.1	µg/L	<0.1	<0.1	<0.1	<0.1	<0.1
EP066: Polychlorinated Biphenyls								
Total Polychlorinated biphenyls	----	1	µg/L	<1	<1	<1	<1	<1
EP068A: Organochlorine Pesticides								
alpha-BHC	319-84-6	0.5	µg/L	<0.5	<0.5	<0.5	<0.5	<0.5

Analytical Results

Sub-Matrix: **WATER** (Matrix: **WATER**)			*Client sample ID*	---- **MB01**	---- **MB02**	---- **MB03**	---- **MB04A**	---- **MB04B**
			Client sampling date / time	31-May-2019 07:50	31-May-2019 13:00	31-May-2019 11:00	31-May-2019 10:00	31-May-2019 09:00
Compound	*CAS Number*	*LOR*	*Unit*	**CA1903638-001**	**CA1903638-002**	**CA1903638-003**	**CA1903638-004**	**CA1903638-005**
				Result	Result	Result	Result	Result
EP068A: Organochlorine Pesticides - Continued								
Hexachlorobenzene (HCB)	118-74-1	0.5	µg/L	<0.5	<0.5	<0.5	<0.5	<0.5
beta-BHC	319-85-7	0.5	µg/L	<0.5	<0.5	<0.5	<0.5	<0.5
gamma-BHC	58-89-9	0.5	µg/L	<0.5	<0.5	<0.5	<0.5	<0.5
delta-BHC	319-86-8	0.5	µg/L	<0.5	<0.5	<0.5	<0.5	<0.5
Heptachlor	76-44-8	0.5	µg/L	<0.5	<0.5	<0.5	<0.5	<0.5
Aldrin	309-00-2	0.5	µg/L	<0.5	<0.5	<0.5	<0.5	<0.5
Heptachlor epoxide	1024-57-3	0.5	µg/L	<0.5	<0.5	<0.5	<0.5	<0.5
trans-Chlordane	5103-74-2	0.5	µg/L	<0.5	<0.5	<0.5	<0.5	<0.5
alpha-Endosulfan	959-98-8	0.5	µg/L	<0.5	<0.5	<0.5	<0.5	<0.5
cis-Chlordane	5103-71-9	0.5	µg/L	<0.5	<0.5	<0.5	<0.5	<0.5
Dieldrin	60-57-1	0.5	µg/L	<0.5	<0.5	<0.5	<0.5	<0.5
4.4`-DDE	72-55-9	0.5	µg/L	<0.5	<0.5	<0.5	<0.5	<0.5
Endrin	72-20-8	0.5	µg/L	<0.5	<0.5	<0.5	<0.5	<0.5
beta-Endosulfan	33213-65-9	0.5	µg/L	<0.5	<0.5	<0.5	<0.5	<0.5
4.4`-DDD	72-54-8	0.5	µg/L	<0.5	<0.5	<0.5	<0.5	<0.5
Endrin aldehyde	7421-93-4	0.5	µg/L	<0.5	<0.5	<0.5	<0.5	<0.5
Endosulfan sulfate	1031-07-8	0.5	µg/L	<0.5	<0.5	<0.5	<0.5	<0.5
4.4`-DDT	50-29-3	2.0	µg/L	<2.0	<2.0	<2.0	<2.0	<2.0
Endrin ketone	53494-70-5	0.5	µg/L	<0.5	<0.5	<0.5	<0.5	<0.5
Methoxychlor	72-43-5	2.0	µg/L	<2.0	<2.0	<2.0	<2.0	<2.0
EP068B: Organophosphorus Pesticides								
Dichlorvos	62-73-7	0.5	µg/L	<0.5	<0.5	<0.5	<0.5	<0.5
Demeton-S-methyl	919-86-8	0.5	µg/L	<0.5	<0.5	<0.5	<0.5	<0.5
Monocrotophos	6923-22-4	2.0	µg/L	<2.0	<2.0	<2.0	<2.0	<2.0
Dimethoate	60-51-5	0.5	µg/L	<0.5	<0.5	<0.5	<0.5	<0.5
Diazinon	333-41-5	0.5	µg/L	<0.5	<0.5	<0.5	<0.5	<0.5
Chlorpyrifos-methyl	5598-13-0	0.5	µg/L	<0.5	<0.5	<0.5	<0.5	<0.5
Parathion-methyl	298-00-0	2.0	µg/L	<2.0	<2.0	<2.0	<2.0	<2.0
Malathion	121-75-5	0.5	µg/L	<0.5	<0.5	<0.5	<0.5	<0.5
Fenthion	55-38-9	0.5	µg/L	<0.5	<0.5	<0.5	<0.5	<0.5
Chlorpyrifos	2921-88-2	0.5	µg/L	<0.5	<0.5	<0.5	<0.5	<0.5
Parathion	56-38-2	2.0	µg/L	<2.0	<2.0	<2.0	<2.0	<2.0
Pirimphos-ethyl	23505-41-1	0.5	µg/L	<0.5	<0.5	<0.5	<0.5	<0.5
Chlorfenvinphos	470-90-6	0.5	µg/L	<0.5	<0.5	<0.5	<0.5	<0.5

Analytical Results

Sub-Matrix: **WATER** (Matrix: **WATER**)			*Client sample ID*	---- **MB01**	---- **MB02**	---- **MB03**	---- **MB04A**	---- **MB04B**
			Client sampling date / time	31-May-2019 07:50	31-May-2019 13:00	31-May-2019 11:00	31-May-2019 10:00	31-May-2019 09:00
Compound	*CAS Number*	*LOR*	*Unit*	**CA1903638-001**	**CA1903638-002**	**CA1903638-003**	**CA1903638-004**	**CA1903638-005**
				Result	Result	Result	Result	Result
EP068B: Organophosphorus Pesticides - Continued								
Bromophos-ethyl	4824-78-6	0.5	µg/L	<0.5	<0.5	<0.5	<0.5	<0.5
Fenamiphos	22224-92-6	0.5	µg/L	<0.5	<0.5	<0.5	<0.5	<0.5
Prothiofos	34643-46-4	0.5	µg/L	<0.5	<0.5	<0.5	<0.5	<0.5
Ethion	563-12-2	0.5	µg/L	<0.5	<0.5	<0.5	<0.5	<0.5
Carbophenothion	786-19-6	0.5	µg/L	<0.5	<0.5	<0.5	<0.5	<0.5
Azinphos Methyl	86-50-0	0.5	µg/L	<0.5	<0.5	<0.5	<0.5	<0.5
EP075(SIM)B: Polynuclear Aromatic Hydrocarbons								
Naphthalene	91-20-3	1.0	µg/L	<1.0	<1.0	<1.0	<1.0	<1.0
Acenaphthylene	208-96-8	1.0	µg/L	<1.0	<1.0	<1.0	<1.0	<1.0
Acenaphthene	83-32-9	1.0	µg/L	<1.0	<1.0	<1.0	<1.0	<1.0
Fluorene	86-73-7	1.0	µg/L	<1.0	<1.0	<1.0	<1.0	<1.0
Phenanthrene	85-01-8	1.0	µg/L	<1.0	<1.0	<1.0	<1.0	<1.0
Anthracene	120-12-7	1.0	µg/L	<1.0	<1.0	<1.0	<1.0	<1.0
Fluoranthene	206-44-0	1.0	µg/L	<1.0	<1.0	<1.0	<1.0	<1.0
Pyrene	129-00-0	1.0	µg/L	<1.0	<1.0	<1.0	<1.0	<1.0
Benz(a)anthracene	56-55-3	1.0	µg/L	<1.0	<1.0	<1.0	<1.0	<1.0
Chrysene	218-01-9	1.0	µg/L	<1.0	<1.0	<1.0	<1.0	<1.0
Benzo(b)fluoranthene	205-99-2	1.0	µg/L	<1.0	<1.0	<1.0	<1.0	<1.0
Benzo(k)fluoranthene	207-08-9	1.0	µg/L	<1.0	<1.0	<1.0	<1.0	<1.0
Benzo(a)pyrene	50-32-8	0.5	µg/L	<0.5	<0.5	<0.5	<0.5	<0.5
Indeno(1.2.3.cd)pyrene	193-39-5	1.0	µg/L	<1.0	<1.0	<1.0	<1.0	<1.0
Dibenz(a.h)anthracene	53-70-3	1.0	µg/L	<1.0	<1.0	<1.0	<1.0	<1.0
Benzo(g.h.i)perylene	191-24-2	1.0	µg/L	<1.0	<1.0	<1.0	<1.0	<1.0
Sum of polycyclic aromatic hydrocarbons	----	0.5	µg/L	<0.5	<0.5	<0.5	<0.5	<0.5
EP080: BTEXN								
Benzene	71-43-2	1	µg/L	<1	<1	<1	<1	<1
Toluene	108-88-3	2	µg/L	<2	<2	<2	<2	<2
Ethylbenzene	100-41-4	2	µg/L	<2	<2	<2	<2	<2
meta- & para-Xylene	108-38-3 106-42-3	2	µg/L	<2	<2	<2	<2	<2
ortho-Xylene	95-47-6	2	µg/L	<2	<2	<2	<2	<2
Total Xylenes	----	2	µg/L	<2	<2	<2	<2	<2
Sum of BTEX	----	1	µg/L	<1	<1	<1	<1	<1
EP080/071: Total Petroleum Hydrocarbons								
C6 - C9 Fraction	----	20	µg/L	<20	<20	<20	<20	<20

Analytical Results

Sub-Matrix: **WATER** (Matrix: **WATER**)			Client sample ID	---- **MB01**	---- **MB02**	---- **MB03**	---- **MB04A**	---- **MB04B**
			Client sampling date / time	31-May-2019 07:50	31-May-2019 13:00	31-May-2019 11:00	31-May-2019 10:00	31-May-2019 09:00
Compound	*CAS Number*	*LOR*	*Unit*	**CA1903638-001**	**CA1903638-002**	**CA1903638-003**	**CA1903638-004**	**CA1903638-005**
				Result	Result	Result	Result	Result
EP080/071: Total Petroleum Hydrocarbons - Continued								
C10 - C14 Fraction	----	50	µg/L	<50	<50	<50	<50	<50
C15 - C28 Fraction	----	100	µg/L	<100	<100	<100	<100	<100
C29 - C36 Fraction	----	50	µg/L	<50	<50	<50	<50	<50
C10 - C36 Fraction (sum)	----	50	µg/L	<50	<50	<50	<50	<50
EP231A: Perfluoroalkyl Sulfonic Acids								
Perfluorobutane sulfonic acid (PFBS)	375-73-5	0.02	µg/L	<0.02	<0.02	<0.02	<0.02	<0.02
Perfluoropentane sulfonic acid (PFPeS)	2706-91-4	0.02	µg/L	<0.02	<0.02	<0.02	<0.02	<0.02
Perfluorohexane sulfonic acid (PFHxS)	355-46-4	0.02	µg/L	<0.02	<0.02	**0.03**	<0.02	<0.02
Perfluoroheptane sulfonic acid (PFHpS)	375-92-8	0.02	µg/L	<0.02	<0.02	<0.02	<0.02	<0.02
Perfluorooctane sulfonic acid (PFOS)	1763-23-1	0.01	µg/L	<0.01	<0.01	**0.03**	<0.01	<0.01
Perfluorodecane sulfonic acid (PFDS)	335-77-3	0.02	µg/L	<0.02	<0.02	<0.02	<0.02	<0.02
EP231B: Perfluoroalkyl Carboxylic Acids								
Perfluorobutanoic acid (PFBA)	375-22-4	0.1	µg/L	<0.1	<0.1	<0.1	<0.1	<0.1
Perfluoropentanoic acid (PFPeA)	2706-90-3	0.02	µg/L	<0.02	<0.02	<0.02	<0.02	<0.02
Perfluorohexanoic acid (PFHxA)	307-24-4	0.02	µg/L	<0.02	<0.02	<0.02	<0.02	<0.02
Perfluoroheptanoic acid (PFHpA)	375-85-9	0.02	µg/L	<0.02	<0.02	<0.02	<0.02	<0.02
Perfluorooctanoic acid (PFOA)	335-67-1	0.01	µg/L	<0.01	<0.01	**0.03**	<0.01	<0.01
Perfluorononanoic acid (PFNA)	375-95-1	0.02	µg/L	<0.02	<0.02	<0.02	<0.02	<0.02
Perfluorodecanoic acid (PFDA)	335-76-2	0.02	µg/L	<0.02	<0.02	<0.02	<0.02	<0.02
Perfluoroundecanoic acid (PFUnDA)	2058-94-8	0.02	µg/L	<0.02	<0.02	<0.02	<0.02	<0.02
Perfluorododecanoic acid (PFDoDA)	307-55-1	0.02	µg/L	<0.02	<0.02	<0.02	<0.02	<0.02
Perfluorotridecanoic acid (PFTrDA)	72629-94-8	0.02	µg/L	<0.02	<0.02	<0.02	<0.02	<0.02
Perfluorotetradecanoic acid (PFTeDA)	376-06-7	0.05	µg/L	<0.05	<0.05	<0.05	<0.05	<0.05
EP231C: Perfluoroalkyl Sulfonamides								

Analytical Results

Sub-Matrix: **WATER** (Matrix: **WATER**)			*Client sample ID*	---- **MB01**	---- **MB02**	---- **MB03**	---- **MB04A**	---- **MB04B**
			Client sampling date / time	31-May-2019 07:50	31-May-2019 13:00	31-May-2019 11:00	31-May-2019 10:00	31-May-2019 09:00
Compound	*CAS Number*	*LOR*	*Unit*	**CA1903638-001**	**CA1903638-002**	**CA1903638-003**	**CA1903638-004**	**CA1903638-005**
				Result	Result	Result	Result	Result
EP231C: Perfluoroalkyl Sulfonamides - Continued								
Perfluorooctane sulfonamide (FOSA)	754-91-6	0.02	µg/L	<0.02	<0.02	<0.02	<0.02	<0.02
N-Methyl perfluorooctane sulfonamide (MeFOSA)	31506-32-8	0.05	µg/L	<0.05	<0.05	<0.05	<0.05	<0.05
N-Ethyl perfluorooctane sulfonamide (EtFOSA)	4151-50-2	0.05	µg/L	<0.05	<0.05	<0.05	<0.05	<0.05
N-Methyl perfluorooctane sulfonamidoethanol (MeFOSE)	24448-09-7	0.05	µg/L	<0.05	<0.05	<0.05	<0.05	<0.05
N-Ethyl perfluorooctane sulfonamidoethanol (EtFOSE)	1691-99-2	0.05	µg/L	<0.05	<0.05	<0.05	<0.05	<0.05
N-Methyl perfluorooctane sulfonamidoacetic acid (MeFOSAA)	2355-31-9	0.02	µg/L	<0.02	<0.02	<0.02	<0.02	<0.02
N-Ethyl perfluorooctane sulfonamidoacetic acid (EtFOSAA)	2991-50-6	0.02	µg/L	<0.02	<0.02	<0.02	<0.02	<0.02
EP231D: (n:2) Fluorotelomer Sulfonic Acids								
4:2 Fluorotelomer sulfonic acid (4:2 FTS)	757124-72-4	0.05	µg/L	<0.05	<0.05	<0.05	<0.05	<0.05
6:2 Fluorotelomer sulfonic acid (6:2 FTS)	27619-97-2	0.05	µg/L	<0.05	<0.05	<0.05	<0.05	<0.05
8:2 Fluorotelomer sulfonic acid (8:2 FTS)	39108-34-4	0.05	µg/L	<0.05	<0.05	<0.05	<0.05	<0.05
10:2 Fluorotelomer sulfonic acid (10:2 FTS)	120226-60-0	0.05	µg/L	<0.05	<0.05	<0.05	<0.05	<0.05
EP231P: PFAS Sums								
Sum of PFAS	----	0.01	µg/L	<0.01	<0.01	**0.09**	<0.01	<0.01

Analytical Results

Sub-Matrix: **WATER**
(Matrix: **WATER**)

			Client sample ID	---- **MB05**	---- **MB06**	----	----	----
			Client sampling date / time	31-May-2019 12:15	31-May-2019 14:00	----	----	----
Compound	*CAS Number*	*LOR*	*Unit*	**CA1903638-006**	**CA1903638-007**	--------	--------	--------
				Result	Result	----	----	----
EA200W: Asbestos in Water								
ø **Asbestos Detected**	1332-21-4	0.1	g/kg	**No**	**No**	----	----	----
ø **Asbestos Type**	1332-21-4	0.1	g/kg	**-**	**-**	----	----	----
ø **Description**	----	1	--	**-**	**-**	----	----	----
ø **APPROVED IDENTIFIER:**	----	1	-	**A. SMYLIE**	**A. SMYLIE**	----	----	----
EA005CA: pH								
pH	----	0.01	pH Unit	**7.92**	**8.19**	----	----	----
EA010CA: Conductivity								
Electrical Conductivity @ 25°C	----	2	µS/cm	**912**	**491**	----	----	----
EA015CA: Total Dissolved Solids								
Total Dissolved Solids	----	10	mg/L	**528**	**295**	----	----	----
EG005CA: Total Metals by ICP-OES								
Iron	7439-89-6	0.01	mg/L	**4.64**	**1.61**	----	----	----
EG020CA: Total Metals by ICP-MS								
Aluminium	7429-90-5	9	µg/L	**5420**	**1770**	----	----	----
Antimony	7440-36-0	3	µg/L	<3	<3	----	----	----
Arsenic	7440-38-2	1	µg/L	<1	**2**	----	----	----
Barium	7440-39-3	0.5	µg/L	**31.7**	**12.7**	----	----	----
Beryllium	7440-41-7	0.1	µg/L	**0.5**	<0.1	----	----	----
Cadmium	7440-43-9	0.05	µg/L	<0.05	<0.05	----	----	----
Chromium	7440-47-3	2	µg/L	**9**	**4**	----	----	----
Cobalt	7440-48-4	0.2	µg/L	**5.1**	**1.9**	----	----	----
Copper	7440-50-8	1	µg/L	**7**	**4**	----	----	----
Lead	7439-92-1	0.2	µg/L	**3.4**	**4.1**	----	----	----
Manganese	7439-96-5	0.5	µg/L	**149**	**38.2**	----	----	----
Molybdenum	7439-98-7	1	µg/L	<1	**1**	----	----	----
Nickel	7440-02-0	1	µg/L	**25**	**12**	----	----	----
Selenium	7782-49-2	1	µg/L	**3**	**1**	----	----	----
Silver	7440-22-4	1	µg/L	<1	<1	----	----	----
Zinc	7440-66-6	5	µg/L	**20**	**59**	----	----	----
Mercury	7439-97-6	0.1	µg/L	<0.1	<0.1	----	----	----
EP066: Polychlorinated Biphenyls								
Total Polychlorinated biphenyls	----	1	µg/L	<1	<1	----	----	----
EP068A: Organochlorine Pesticides								
alpha-BHC	319-84-6	0.5	µg/L	<0.5	<0.5	----	----	----

Analytical Results

Sub-Matrix: **WATER** (Matrix: **WATER**)			*Client sample ID*	---- **MB05**	---- **MB06**	----	----	----
			Client sampling date / time	31-May-2019 12:15	31-May-2019 14:00	----	----	----
Compound	*CAS Number*	*LOR*	*Unit*	**CA1903638-006**	**CA1903638-007**	--------	--------	--------
				Result	Result	----	----	----
EP068A: Organochlorine Pesticides - Continued								
Hexachlorobenzene (HCB)	118-74-1	0.5	µg/L	<0.5	<0.5	----	----	----
beta-BHC	319-85-7	0.5	µg/L	<0.5	<0.5	----	----	----
gamma-BHC	58-89-9	0.5	µg/L	<0.5	<0.5	----	----	----
delta-BHC	319-86-8	0.5	µg/L	<0.5	<0.5	----	----	----
Heptachlor	76-44-8	0.5	µg/L	<0.5	<0.5	----	----	----
Aldrin	309-00-2	0.5	µg/L	<0.5	<0.5	----	----	----
Heptachlor epoxide	1024-57-3	0.5	µg/L	<0.5	<0.5	----	----	----
trans-Chlordane	5103-74-2	0.5	µg/L	<0.5	<0.5	----	----	----
alpha-Endosulfan	959-98-8	0.5	µg/L	<0.5	<0.5	----	----	----
cis-Chlordane	5103-71-9	0.5	µg/L	<0.5	<0.5	----	----	----
Dieldrin	60-57-1	0.5	µg/L	<0.5	<0.5	----	----	----
4.4`-DDE	72-55-9	0.5	µg/L	<0.5	<0.5	----	----	----
Endrin	72-20-8	0.5	µg/L	<0.5	<0.5	----	----	----
beta-Endosulfan	33213-65-9	0.5	µg/L	<0.5	<0.5	----	----	----
4.4`-DDD	72-54-8	0.5	µg/L	<0.5	<0.5	----	----	----
Endrin aldehyde	7421-93-4	0.5	µg/L	<0.5	<0.5	----	----	----
Endosulfan sulfate	1031-07-8	0.5	µg/L	<0.5	<0.5	----	----	----
4.4`-DDT	50-29-3	2.0	µg/L	<2.0	<2.0	----	----	----
Endrin ketone	53494-70-5	0.5	µg/L	<0.5	<0.5	----	----	----
Methoxychlor	72-43-5	2.0	µg/L	<2.0	<2.0	----	----	----
EP068B: Organophosphorus Pesticides								
Dichlorvos	62-73-7	0.5	µg/L	<0.5	<0.5	----	----	----
Demeton-S-methyl	919-86-8	0.5	µg/L	<0.5	<0.5	----	----	----
Monocrotophos	6923-22-4	2.0	µg/L	<2.0	<2.0	----	----	----
Dimethoate	60-51-5	0.5	µg/L	<0.5	<0.5	----	----	----
Diazinon	333-41-5	0.5	µg/L	<0.5	<0.5	----	----	----
Chlorpyrifos-methyl	5598-13-0	0.5	µg/L	<0.5	<0.5	----	----	----
Parathion-methyl	298-00-0	2.0	µg/L	<2.0	<2.0	----	----	----
Malathion	121-75-5	0.5	µg/L	<0.5	<0.5	----	----	----
Fenthion	55-38-9	0.5	µg/L	<0.5	<0.5	----	----	----
Chlorpyrifos	2921-88-2	0.5	µg/L	<0.5	<0.5	----	----	----
Parathion	56-38-2	2.0	µg/L	<2.0	<2.0	----	----	----
Pirimphos-ethyl	23505-41-1	0.5	µg/L	<0.5	<0.5	----	----	----
Chlorfenvinphos	470-90-6	0.5	µg/L	<0.5	<0.5	----	----	----

Analytical Results

Sub-Matrix: **WATER** (Matrix: **WATER**)			*Client sample ID*	---- **MB05**	---- **MB06**	----	----	----
			Client sampling date / time	31-May-2019 12:15	31-May-2019 14:00	----	----	----
Compound	*CAS Number*	*LOR*	*Unit*	**CA1903638-006**	**CA1903638-007**	--------	--------	--------
				Result	Result	----	----	----
EP068B: Organophosphorus Pesticides - Continued								
Bromophos-ethyl	4824-78-6	0.5	µg/L	<0.5	<0.5	----	----	----
Fenamiphos	22224-92-6	0.5	µg/L	<0.5	<0.5	----	----	----
Prothiofos	34643-46-4	0.5	µg/L	<0.5	<0.5	----	----	----
Ethion	563-12-2	0.5	µg/L	<0.5	<0.5	----	----	----
Carbophenothion	786-19-6	0.5	µg/L	<0.5	<0.5	----	----	----
Azinphos Methyl	86-50-0	0.5	µg/L	<0.5	<0.5	----	----	----
EP075(SIM)B: Polynuclear Aromatic Hydrocarbons								
Naphthalene	91-20-3	1.0	µg/L	<1.0	<1.0	----	----	----
Acenaphthylene	208-96-8	1.0	µg/L	<1.0	<1.0	----	----	----
Acenaphthene	83-32-9	1.0	µg/L	<1.0	<1.0	----	----	----
Fluorene	86-73-7	1.0	µg/L	<1.0	<1.0	----	----	----
Phenanthrene	85-01-8	1.0	µg/L	<1.0	<1.0	----	----	----
Anthracene	120-12-7	1.0	µg/L	<1.0	<1.0	----	----	----
Fluoranthene	206-44-0	1.0	µg/L	<1.0	<1.0	----	----	----
Pyrene	129-00-0	1.0	µg/L	<1.0	<1.0	----	----	----
Benz(a)anthracene	56-55-3	1.0	µg/L	<1.0	<1.0	----	----	----
Chrysene	218-01-9	1.0	µg/L	<1.0	<1.0	----	----	----
Benzo(b)fluoranthene	205-99-2	1.0	µg/L	<1.0	<1.0	----	----	----
Benzo(k)fluoranthene	207-08-9	1.0	µg/L	<1.0	<1.0	----	----	----
Benzo(a)pyrene	50-32-8	0.5	µg/L	<0.5	<0.5	----	----	----
Indeno(1.2.3.cd)pyrene	193-39-5	1.0	µg/L	<1.0	<1.0	----	----	----
Dibenz(a.h)anthracene	53-70-3	1.0	µg/L	<1.0	<1.0	----	----	----
Benzo(g.h.i)perylene	191-24-2	1.0	µg/L	<1.0	<1.0	----	----	----
Sum of polycyclic aromatic hydrocarbons	----	0.5	µg/L	<0.5	<0.5	----	----	----
EP080: BTEXN								
Benzene	71-43-2	1	µg/L	<1	<1	----	----	----
Toluene	108-88-3	2	µg/L	<2	<2	----	----	----
Ethylbenzene	100-41-4	2	µg/L	<2	<2	----	----	----
meta- & para-Xylene	108-38-3 106-42-3	2	µg/L	<2	<2	----	----	----
ortho-Xylene	95-47-6	2	µg/L	<2	<2	----	----	----
Total Xylenes	----	2	µg/L	<2	<2	----	----	----
Sum of BTEX	----	1	µg/L	<1	<1	----	----	----
EP080/071: Total Petroleum Hydrocarbons								
C6 - C9 Fraction	----	20	µg/L	<20	<20	----	----	----

Analytical Results

Sub-Matrix: **WATER** (Matrix: **WATER**)			*Client sample ID*	---- **MB05**	---- **MB06**	----	----	----
			Client sampling date / time	31-May-2019 12:15	31-May-2019 14:00	----	----	----
Compound	*CAS Number*	*LOR*	*Unit*	**CA1903638-006**	**CA1903638-007**	--------	--------	--------
				Result	Result	----	----	----
EP080/071: Total Petroleum Hydrocarbons - Continued								
C10 - C14 Fraction	----	50	µg/L	<50	<50	----	----	----
C15 - C28 Fraction	----	100	µg/L	<100	<100	----	----	----
C29 - C36 Fraction	----	50	µg/L	<50	<50	----	----	----
C10 - C36 Fraction (sum)	----	50	µg/L	<50	<50	----	----	----
EP231A: Perfluoroalkyl Sulfonic Acids								
Perfluorobutane sulfonic acid (PFBS)	375-73-5	0.02	µg/L	<0.02	<0.02	----	----	----
Perfluoropentane sulfonic acid (PFPeS)	2706-91-4	0.02	µg/L	<0.02	<0.02	----	----	----
Perfluorohexane sulfonic acid (PFHxS)	355-46-4	0.02	µg/L	**0.03**	<0.02	----	----	----
Perfluoroheptane sulfonic acid (PFHpS)	375-92-8	0.02	µg/L	<0.02	<0.02	----	----	----
Perfluorooctane sulfonic acid (PFOS)	1763-23-1	0.01	µg/L	**0.01**	<0.01	----	----	----
Perfluorodecane sulfonic acid (PFDS)	335-77-3	0.02	µg/L	<0.02	<0.02	----	----	----
EP231B: Perfluoroalkyl Carboxylic Acids								
Perfluorobutanoic acid (PFBA)	375-22-4	0.1	µg/L	<0.1	<0.1	----	----	----
Perfluoropentanoic acid (PFPeA)	2706-90-3	0.02	µg/L	**0.03**	<0.02	----	----	----
Perfluorohexanoic acid (PFHxA)	307-24-4	0.02	µg/L	**0.05**	<0.02	----	----	----
Perfluoroheptanoic acid (PFHpA)	375-85-9	0.02	µg/L	**0.02**	<0.02	----	----	----
Perfluorooctanoic acid (PFOA)	335-67-1	0.01	µg/L	**0.06**	**0.02**	----	----	----
Perfluorononanoic acid (PFNA)	375-95-1	0.02	µg/L	<0.02	<0.02	----	----	----
Perfluorodecanoic acid (PFDA)	335-76-2	0.02	µg/L	<0.02	<0.02	----	----	----
Perfluoroundecanoic acid (PFUnDA)	2058-94-8	0.02	µg/L	<0.02	<0.02	----	----	----
Perfluorododecanoic acid (PFDoDA)	307-55-1	0.02	µg/L	<0.02	<0.02	----	----	----
Perfluorotridecanoic acid (PFTrDA)	72629-94-8	0.02	µg/L	<0.02	<0.02	----	----	----
Perfluorotetradecanoic acid (PFTeDA)	376-06-7	0.05	µg/L	<0.05	<0.05	----	----	----
EP231C: Perfluoroalkyl Sulfonamides								

Analytical Results

Sub-Matrix: **WATER** (Matrix: **WATER**)			*Client sample ID*	---- **MB05**	---- **MB06**	----	----	----
			Client sampling date / time	31-May-2019 12:15	31-May-2019 14:00	----	----	----
Compound	*CAS Number*	*LOR*	*Unit*	**CA1903638-006**	**CA1903638-007**	--------	--------	--------
				Result	Result	----	----	----
EP231C: Perfluoroalkyl Sulfonamides - Continued								
Perfluorooctane sulfonamide (FOSA)	754-91-6	0.02	µg/L	<0.02	<0.02	----	----	----
N-Methyl perfluorooctane sulfonamide (MeFOSA)	31506-32-8	0.05	µg/L	<0.05	<0.05	----	----	----
N-Ethyl perfluorooctane sulfonamide (EtFOSA)	4151-50-2	0.05	µg/L	<0.05	<0.05	----	----	----
N-Methyl perfluorooctane sulfonamidoethanol (MeFOSE)	24448-09-7	0.05	µg/L	<0.05	<0.05	----	----	----
N-Ethyl perfluorooctane sulfonamidoethanol (EtFOSE)	1691-99-2	0.05	µg/L	<0.05	<0.05	----	----	----
N-Methyl perfluorooctane sulfonamidoacetic acid (MeFOSAA)	2355-31-9	0.02	µg/L	<0.02	<0.02	----	----	----
N-Ethyl perfluorooctane sulfonamidoacetic acid (EtFOSAA)	2991-50-6	0.02	µg/L	<0.02	<0.02	----	----	----
EP231D: (n:2) Fluorotelomer Sulfonic Acids								
4:2 Fluorotelomer sulfonic acid (4:2 FTS)	757124-72-4	0.05	µg/L	<0.05	<0.05	----	----	----
6:2 Fluorotelomer sulfonic acid (6:2 FTS)	27619-97-2	0.05	µg/L	<0.05	<0.05	----	----	----
8:2 Fluorotelomer sulfonic acid (8:2 FTS)	39108-34-4	0.05	µg/L	<0.05	<0.05	----	----	----
10:2 Fluorotelomer sulfonic acid (10:2 FTS)	120226-60-0	0.05	µg/L	<0.05	<0.05	----	----	----
EP231P: PFAS Sums								
Sum of PFAS	----	0.01	µg/L	**0.20**	**0.02**	----	----	----

ALS Environmental

CHAIN OF CUSTODY

ALS Laboratory: please tick →

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Ph 08 8359 0890 E adelaide@alsglobal.com

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CLIENT: EMM Consulting

OFFICE: St Leonards, Sydney

PROJECT: J17188 - EIS Polo Flat

ORDER NUMBER:

PROJECT MANAGER: Claire Corthier **CONTACT PH:** 0431 172 240

SAMPLER: Claire Corthier **SAMPLER MOBILE:** 0431 172 240

COC emailed to ALS? YES **EDD FORMAT (or default):**

Email Reports to (will default to PM if no other addresses are listed): **ccorthier@emmconsulting.com.au**

Email Invoice to (will default to PM if no other addresses are listed): **ccorthier@emmconsulting.com.au**

TURNAROUND REQUIREMENTS : (Standard TAT may be longer for some tests e.g.. Ultra Trace Organics)

☒ Standard TAT **(List due date):**

☐ Non Standard or urgent TAT **(List due date):**

ALS QUOTE NO.:

COC SEQUENCE NUMBER (Circle)

COC: 1 2 3 4 5 6 7

OF: 1 2 3 4 5 6 7

FOR LABORATORY USE ONLY (Circle)

Custody Seal Intact? Yes No N/A

Free ice / frozen ice bricks present upon receipt? Yes No N/A

Random Sample Temperature on Receipt: °C

Other comment:

RELINQUISHED BY:	RECEIVED BY:	RELINQUISHED BY:	RECEIVED BY:
Claire Corthier			
DATE/TIME: 31/05/2019 16:45	DATE/TIME: 31.05.2019 5:00pm	DATE/TIME:	DATE/TIME:

COMMENTS/SPECIAL HANDLING/STORAGE OR DISPOSAL: [illegible] Received after hours. processed 03.06.19. *

ALS USE	SAMPLE DETAILS MATRIX: SOLID (S) WATER (W)			CONTAINER INFORMATION		ANALYSIS REQUIRED including SUITES (NB. Suite Codes must be listed to attract suite price) Where Metals are required, specify Total (unfiltered bottle required) or Dissolved (field filtered bottle required).								Additional Information
LAB ID	SAMPLE ID	DATE / TIME	MATRIX	TYPE & PRESERVATIVE (refer to codes below)	TOTAL CONTAINERS	pH, EC, TDS EA005, EA015H, EA010	Total Metals EG020A-T	Asbestos EA200W	TRH/BTEX/PAH W-7	OC / OP Pesticides W-12	PCB EP066	PFOS/PFOA EP231X		Comments on likely contaminant levels, dilutions, or samples requiring specific QC analysis etc.
	MB01	31/05/2019 7:50	W		7	X	X	X	X	X	X	X		
	MB02	31/05/2019 13:00	W		7	X	X	X	X	X	X	X		
	MB03	31/05/2019 11:00	W		7	X	X	X	X	X	X	X		
	MB04A	31/05/2019 10:00	W		7	X	X	X	X	X	X	X		
	MB04B	31/05/2019 9:00	W		7	X	X	X	X	X	X	X		
	MB05	31/05/2019 12:15	W		7	X	X	X	X	X	X	X		
	MB06	31/05/2019 14:00	W		7	X	X	X	X	X	X	X		
				TOTAL	49	7	7	7	7	7	7	7		

ALS Water Resources Grou
Canberra
Work Order Reference
CA1903638

Telephone : + 61 2 6202 5404

Water Container Codes: P = Unpreserved Plastic; N = Nitric Preserved Plastic; ORC = Nitric Preserved ORC; SH = Sodium Hydroxide/Cd Preserved; S = Sodium Hydroxide Preserved Plastic; AG = Amber Glass Unpreserved; AP - Airfreight Unpreserved Plastic
V = VOA Vial HCl Preserved; VB = VOA Vial Sodium Bisulphate Preserved; VS = VOA Vial Sulfuric Preserved; AV = Airfreight Unpreserved Vial SG = Sulfuric Preserved Amber Glass; H = HCl preserved Plastic; HS = HCl preserved Speciation bottle; SP = Sulfuric Preserved Plastic; F = Formaldehyde Preserved Glass;
Z = Zinc Acetate Preserved Bottle; E = EDTA Preserved Bottles; ST = Sterile Bottle; ASS = Plastic Bag for Acid Sulphate Soils; B = Unpreserved Bag.

* COC received 04.06.19 900am
with instructions + analysis.

Envirolab Services Pty Ltd
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CERTIFICATE OF ANALYSIS 216239

Client Details

Client	Robson Environmental Pty Ltd
Attention	Alex Hannan-Joyner
Address	PO Box 112, Fyshwick, ACT, 2609

Sample Details

Your Reference	**10903**
Number of Samples	2 Soil
Date samples received	24/04/2019
Date completed instructions received	26/04/2019

Analysis Details

Please refer to the following pages for results, methodology summary and quality control data.

Samples were analysed as received from the client. Results relate specifically to the samples as received.

Results are reported on a dry weight basis for solids and on an as received basis for other matrices.

Please refer to the last page of this report for any comments relating to the results.

Report Details

Date results requested by	26/04/2019
Date of Issue	26/04/2019

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Accredited for compliance with ISO/IEC 17025 - Testing. **Tests not covered by NATA are denoted with ***

Results Approved By
Alexander Mitchell Maclean, Senior Chemist
Fiona Tan, Chemist
Jeremy Faircloth, Operations Manager, Sydney
Steven Luong, Organics Supervisor

Authorised By

Nancy Zhang, Laboratory Manager

vTRH(C6-C10)/BTEXN in Soil			
Our Reference		216239-1	216239-2
Your Reference	UNITS	QC02	QC04
Date Sampled		17/04/2019	17/04/2019
Type of sample		Soil	Soil
Date extracted	-	24/04/2019	24/04/2019
Date analysed	-	25/04/2019	25/04/2019
TRH C_6 - C_9	mg/kg	<25	<25
TRH C_6 - C_{10}	mg/kg	<25	<25
vTPH C_6 - C_{10} less BTEX (F1)	mg/kg	<25	<25
Benzene	mg/kg	<0.2	<0.2
Toluene	mg/kg	<0.5	<0.5
Ethylbenzene	mg/kg	<1	<1
m+p-xylene	mg/kg	<2	<2
o-Xylene	mg/kg	<1	<1
naphthalene	mg/kg	<1	<1
Total +ve Xylenes	mg/kg	<1	<1
Surrogate aaa-Trifluorotoluene	%	82	86

svTRH (C10-C40) in Soil			
Our Reference		216239-1	216239-2
Your Reference	UNITS	QC02	QC04
Date Sampled		17/04/2019	17/04/2019
Type of sample		Soil	Soil
Date extracted	-	24/04/2019	24/04/2019
Date analysed	-	25/04/2019	25/04/2019
TRH C_{10} - C_{14}	mg/kg	<50	<50
TRH C_{15} - C_{28}	mg/kg	200	<100
TRH C_{29} - C_{36}	mg/kg	540	320
TRH >C_{10} -C_{16}	mg/kg	<50	<50
TRH >C_{10} - C_{16} less Naphthalene (F2)	mg/kg	<50	<50
TRH >C_{16} -C_{34}	mg/kg	580	280
TRH >C_{34} -C_{40}	mg/kg	430	140
Total +ve TRH (>C10-C40)	mg/kg	1,000	420
Surrogate o-Terphenyl	%	94	93

PAHs in Soil			
Our Reference		216239-1	216239-2
Your Reference	UNITS	QC02	QC04
Date Sampled		17/04/2019	17/04/2019
Type of sample		Soil	Soil
Date extracted	-	24/04/2019	24/04/2019
Date analysed	-	26/04/2019	26/04/2019
Naphthalene	mg/kg	<0.1	<0.1
Acenaphthylene	mg/kg	<0.1	<0.1
Acenaphthene	mg/kg	<0.1	<0.1
Fluorene	mg/kg	<0.1	<0.1
Phenanthrene	mg/kg	<0.1	<0.1
Anthracene	mg/kg	<0.1	<0.1
Fluoranthene	mg/kg	<0.1	0.1
Pyrene	mg/kg	<0.1	0.1
Benzo(a)anthracene	mg/kg	<0.1	<0.1
Chrysene	mg/kg	<0.1	<0.1
Benzo(b,j+k)fluoranthene	mg/kg	<0.2	<0.2
Benzo(a)pyrene	mg/kg	<0.05	0.06
Indeno(1,2,3-c,d)pyrene	mg/kg	<0.1	<0.1
Dibenzo(a,h)anthracene	mg/kg	<0.1	<0.1
Benzo(g,h,i)perylene	mg/kg	<0.1	<0.1
Total +ve PAH's	mg/kg	<0.05	0.3
Benzo(a)pyrene TEQ calc (zero)	mg/kg	<0.5	<0.5
Benzo(a)pyrene TEQ calc(half)	mg/kg	<0.5	<0.5
Benzo(a)pyrene TEQ calc(PQL)	mg/kg	<0.5	<0.5
Surrogate p-Terphenyl-d14	%	88	97

Organochlorine Pesticides in soil			
Our Reference		216239-1	216239-2
Your Reference	UNITS	QC02	QC04
Date Sampled		17/04/2019	17/04/2019
Type of sample		Soil	Soil
Date extracted	-	24/04/2019	24/04/2019
Date analysed	-	24/04/2019	24/04/2019
HCB	mg/kg	<0.1	<0.1
alpha-BHC	mg/kg	<0.1	<0.1
gamma-BHC	mg/kg	<0.1	<0.1
beta-BHC	mg/kg	<0.1	<0.1
Heptachlor	mg/kg	<0.1	<0.1
delta-BHC	mg/kg	<0.1	<0.1
Aldrin	mg/kg	<0.1	<0.1
Heptachlor Epoxide	mg/kg	<0.1	<0.1
gamma-Chlordane	mg/kg	<0.1	<0.1
alpha-chlordane	mg/kg	<0.1	<0.1
Endosulfan I	mg/kg	<0.1	<0.1
pp-DDE	mg/kg	<0.1	<0.1
Dieldrin	mg/kg	<0.1	<0.1
Endrin	mg/kg	<0.1	<0.1
pp-DDD	mg/kg	<0.1	<0.1
Endosulfan II	mg/kg	<0.1	<0.1
pp-DDT	mg/kg	<0.1	<0.1
Endrin Aldehyde	mg/kg	<0.1	<0.1
Endosulfan Sulphate	mg/kg	<0.1	<0.1
Methoxychlor	mg/kg	<0.1	<0.1
Total +ve DDT+DDD+DDE	mg/kg	<0.1	<0.1
Surrogate TCMX	%	92	92

Organophosphorus Pesticides			
Our Reference		216239-1	216239-2
Your Reference	UNITS	QC02	QC04
Date Sampled		17/04/2019	17/04/2019
Type of sample		Soil	Soil
Date extracted	-	24/04/2019	24/04/2019
Date analysed	-	24/04/2019	24/04/2019
Azinphos-methyl (Guthion)	mg/kg	<0.1	<0.1
Bromophos-ethyl	mg/kg	<0.1	<0.1
Chlorpyriphos	mg/kg	<0.1	<0.1
Chlorpyriphos-methyl	mg/kg	<0.1	<0.1
Diazinon	mg/kg	<0.1	<0.1
Dichlorvos	mg/kg	<0.1	<0.1
Dimethoate	mg/kg	<0.1	<0.1
Ethion	mg/kg	<0.1	<0.1
Fenitrothion	mg/kg	<0.1	<0.1
Malathion	mg/kg	<0.1	<0.1
Parathion	mg/kg	<0.1	<0.1
Ronnel	mg/kg	<0.1	<0.1
Surrogate TCMX	%	92	92

PCBs in Soil		
Our Reference		216239-2
Your Reference	UNITS	QC04
Date Sampled		17/04/2019
Type of sample		Soil
Date extracted	-	24/04/2019
Date analysed	-	24/04/2019
Aroclor 1016	mg/kg	<0.1
Aroclor 1221	mg/kg	<0.1
Aroclor 1232	mg/kg	<0.1
Aroclor 1242	mg/kg	<0.1
Aroclor 1248	mg/kg	<0.1
Aroclor 1254	mg/kg	<0.1
Aroclor 1260	mg/kg	<0.1
Total +ve PCBs (1016-1260)	mg/kg	<0.1
Surrogate TCLMX	%	92

Total PCBs in Soil		
Our Reference		216239-1
Your Reference	UNITS	QC02
Date Sampled		17/04/2019
Type of sample		Soil
Date extracted	-	24/04/2019
Date analysed	-	24/04/2019
Total PCB (Aroclor 1016-1260)	mg/kg	1.8
Surrogate TCLMX	%	92

Acid Extractable metals in soil			
Our Reference		216239-1	216239-2
Your Reference	UNITS	QC02	QC04
Date Sampled		17/04/2019	17/04/2019
Type of sample		Soil	Soil
Date prepared	-	24/04/2019	24/04/2019
Date analysed	-	24/04/2019	24/04/2019
Arsenic	mg/kg	<4	<4
Cadmium	mg/kg	3	<0.4
Chromium	mg/kg	57	72
Copper	mg/kg	85	37
Lead	mg/kg	130	140
Mercury	mg/kg	<0.1	<0.1
Nickel	mg/kg	59	68
Zinc	mg/kg	1,900	60

Moisture			
Our Reference		216239-1	216239-2
Your Reference	UNITS	QC02	QC04
Date Sampled		17/04/2019	17/04/2019
Type of sample		Soil	Soil
Date prepared	-	24/04/2019	24/04/2019
Date analysed	-	26/04/2019	26/04/2019
Moisture	%	26	9.5

PFAS in Soils Short			
Our Reference		216239-1	216239-2
Your Reference	UNITS	QC02	QC04
Date Sampled		17/04/2019	17/04/2019
Type of sample		Soil	Soil
Date prepared	-	24/04/2019	24/04/2019
Date analysed	-	24/04/2019	24/04/2019
Perfluorohexanesulfonic acid - PFHxS	µg/kg	0.1	<0.1
Perfluorooctanesulfonic acid PFOS	µg/kg	8.6	0.3
Perfluorooctanoic acid PFOA	µg/kg	0.3	<0.1
6:2 FTS	µg/kg	<0.1	<0.1
8:2 FTS	µg/kg	<0.1	<0.1
Surrogate $^{13}C_8$ *PFOS*	%	110	112
Surrogate $^{13}C_2$ *PFOA*	%	99	105
Extracted ISTD $^{18}O_2$ *PFHxS*	%	90	92
Extracted ISTD $^{13}C_4$ *PFOS*	%	95	102
Extracted ISTD $^{13}C_4$ *PFOA*	%	93	99
Extracted ISTD $^{13}C_2$ *6:2FTS*	%	114	133
Extracted ISTD $^{13}C_2$ *8:2FTS*	%	146	172
Total Positive PFHxS & PFOS	µg/kg	8.7	0.3
Total Positive PFOS & PFOA	µg/kg	8.9	0.3
Total Positive PFAS	µg/kg	9.0	0.3

Method ID	Methodology Summary
Inorg-008	Moisture content determined by heating at 105+/-5 °C for a minimum of 12 hours.
Metals-020	Determination of various metals by ICP-AES.
Metals-021	Determination of Mercury by Cold Vapour AAS.
Org-003	Soil samples are extracted with Dichloromethane/Acetone and waters with Dichloromethane and analysed by GC-FID. F2 = (>C10-C16)-Naphthalene as per NEPM B1 Guideline on Investigation Levels for Soil and Groundwater (HSLs Tables 1A (3, 4)). Note Naphthalene is determined from the VOC analysis.
Org-003	Soil samples are extracted with Dichloromethane/Acetone and waters with Dichloromethane and analysed by GC-FID. F2 = (>C10-C16)-Naphthalene as per NEPM B1 Guideline on Investigation Levels for Soil and Groundwater (HSLs Tables 1A (3, 4)). Note Naphthalene is determined from the VOC analysis. Note, the Total +ve TRH PQL is reflective of the lowest individual PQL and is therefore "Total +ve TRH" is simply a sum of the positive individual TRH fractions (>C10-C40).
Org-005	Soil samples are extracted with dichloromethane/acetone and waters with dichloromethane and analysed by GC with dual ECD's.
Org-005	Soil samples are extracted with dichloromethane/acetone and waters with dichloromethane and analysed by GC with dual ECD's. Note, the Total +ve reported DDD+DDE+DDT PQL is reflective of the lowest individual PQL and is therefore simply a sum of the positive individually report DDD+DDE+DDT.
Org-006	Soil samples are extracted with dichloromethane/acetone and waters with dichloromethane and analysed by GC-ECD.
Org-006	Soil samples are extracted with dichloromethane/acetone and waters with dichloromethane and analysed by GC-ECD. Note, the Total +ve PCBs PQL is reflective of the lowest individual PQL and is therefore" Total +ve PCBs" is simply a sum of the positive individual PCBs.
Org-008	Soil samples are extracted with dichloromethane/acetone and waters with dichloromethane and analysed by GC with dual ECD's.

Method ID	Methodology Summary
Org-012	Soil samples are extracted with Dichloromethane/Acetone and waters with Dichloromethane and analysed by GC-MS. Benzo(a)pyrene TEQ as per NEPM B1 Guideline on Investigation Levels for Soil and Groundwater - 2013. For soil results:- 1. 'EQ PQL'values are assuming all contributing PAHs reported as <PQL are actually at the PQL. This is the most conservative approach and can give false positive TEQs given that PAHs that contribute to the TEQ calculation may not be present. 2. 'EQ zero'values are assuming all contributing PAHs reported as <PQL are zero. This is the least conservative approach and is more susceptible to false negative TEQs when PAHs that contribute to the TEQ calculation are present but below PQL. 3. 'EQ half PQL'values are assuming all contributing PAHs reported as <PQL are half the stipulated PQL. Hence a mid-point between the most and least conservative approaches above. Note, the Total +ve PAHs PQL is reflective of the lowest individual PQL and is therefore "Total +ve PAHs" is simply a sum of the positive individual PAHs.
Org-014	Soil samples are extracted with methanol and spiked into water prior to analysing by purge and trap GC-MS.
Org-016	Soil samples are extracted with methanol and spiked into water prior to analysing by purge and trap GC-MS. Water samples are analysed directly by purge and trap GC-MS. F1 = (C6-C10)-BTEX as per NEPM B1 Guideline on Investigation Levels for Soil and Groundwater.
Org-016	Soil samples are extracted with methanol and spiked into water prior to analysing by purge and trap GC-MS. Water samples are analysed directly by purge and trap GC-MS. F1 = (C6-C10)-BTEX as per NEPM B1 Guideline on Investigation Levels for Soil and Groundwater. Note, the Total +ve Xylene PQL is reflective of the lowest individual PQL and is therefore "Total +ve Xylenes" is simply a sum of the positive individual Xylenes.
Org-035	Soil samples are extracted with basified Methanol. Waters and soil extracts are directly injected and/or concentrated/extracted using SPE. Analysis is undertaken with LC-MS/MS. PFAS results include the sum of branched and linear isomers where applicable. Please note that PFAS results are corrected for Extracted Internal Standards (QSM 5.1 Table B-15 terminology), which are mass labelled analytes added prior to sample preparation to assess matrix effects and verify processing of the sample. PFAS analytes without a commercially available mass labelled analogue are corrected vs a closely eluting mass labelled PFAS compound. Surrogates are also reported, in this context they are mass labelled PFAS compounds added prior to extraction but are used as monitoring compounds only (not used for result correction). Envicarb (or similar) is used discretionally to remove interfering matrix components. Please contact the laboratory if estimates of Measurement Uncertainty are required as per WA DER.

QUALITY CONTROL: vTRH(C6-C10)/BTEXN in Soil					Duplicate				Spike Recovery %	
Test Description	Units	PQL	Method	Blank	#	Base	Dup.	RPD	LCS-8	[NT]
Date extracted	-			24/04/2019	[NT]	[NT]	[NT]	[NT]	24/04/2019	[NT]
Date analysed	-			25/04/2019	[NT]	[NT]	[NT]	[NT]	25/04/2019	[NT]
TRH C_6 - C_9	mg/kg	25	Org-016	<25	[NT]	[NT]	[NT]	[NT]	95	[NT]
TRH C_6 - C_{10}	mg/kg	25	Org-016	<25	[NT]	[NT]	[NT]	[NT]	95	[NT]
Benzene	mg/kg	0.2	Org-016	<0.2	[NT]	[NT]	[NT]	[NT]	60	[NT]
Toluene	mg/kg	0.5	Org-016	<0.5	[NT]	[NT]	[NT]	[NT]	76	[NT]
Ethylbenzene	mg/kg	1	Org-016	<1	[NT]	[NT]	[NT]	[NT]	111	[NT]
m+p-xylene	mg/kg	2	Org-016	<2	[NT]	[NT]	[NT]	[NT]	115	[NT]
o-Xylene	mg/kg	1	Org-016	<1	[NT]	[NT]	[NT]	[NT]	114	[NT]
naphthalene	mg/kg	1	Org-014	<1	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]
Surrogate aaa-Trifluorotoluene	%		Org-016	85	[NT]	[NT]	[NT]	[NT]	89	[NT]

QUALITY CONTROL: svTRH (C10-C40) in Soil					Duplicate				Spike Recovery %	
Test Description	Units	PQL	Method	Blank	#	Base	Dup.	RPD	LCS-8	[NT]
Date extracted	-			24/04/2019	[NT]	[NT]	[NT]	[NT]	24/04/2019	[NT]
Date analysed	-			25/04/2019	[NT]	[NT]	[NT]	[NT]	25/04/2019	[NT]
TRH C_{10} - C_{14}	mg/kg	50	Org-003	<50	[NT]	[NT]	[NT]	[NT]	123	[NT]
TRH C_{15} - C_{28}	mg/kg	100	Org-003	<100	[NT]	[NT]	[NT]	[NT]	106	[NT]
TRH C_{29} - C_{36}	mg/kg	100	Org-003	<100	[NT]	[NT]	[NT]	[NT]	129	[NT]
TRH >C_{10} -C_{16}	mg/kg	50	Org-003	<50	[NT]	[NT]	[NT]	[NT]	123	[NT]
TRH >C_{16} -C_{34}	mg/kg	100	Org-003	<100	[NT]	[NT]	[NT]	[NT]	106	[NT]
TRH >C_{34} -C_{40}	mg/kg	100	Org-003	<100	[NT]	[NT]	[NT]	[NT]	129	[NT]
Surrogate o-Terphenyl	%		Org-003	90	[NT]	[NT]	[NT]	[NT]	105	[NT]

QUALITY CONTROL: PAHs in Soil						Duplicate			Spike Recovery %	
Test Description	Units	PQL	Method	Blank	#	Base	Dup.	RPD	LCS-8	[NT]
Date extracted	-			24/04/2019	[NT]	[NT]	[NT]	[NT]	24/04/2019	[NT]
Date analysed	-			26/04/2019	[NT]	[NT]	[NT]	[NT]	26/04/2019	[NT]
Naphthalene	mg/kg	0.1	Org-012	<0.1	[NT]	[NT]	[NT]	[NT]	128	[NT]
Acenaphthylene	mg/kg	0.1	Org-012	<0.1	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]
Acenaphthene	mg/kg	0.1	Org-012	<0.1	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]
Fluorene	mg/kg	0.1	Org-012	<0.1	[NT]	[NT]	[NT]	[NT]	118	[NT]
Phenanthrene	mg/kg	0.1	Org-012	<0.1	[NT]	[NT]	[NT]	[NT]	112	[NT]
Anthracene	mg/kg	0.1	Org-012	<0.1	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]
Fluoranthene	mg/kg	0.1	Org-012	<0.1	[NT]	[NT]	[NT]	[NT]	112	[NT]
Pyrene	mg/kg	0.1	Org-012	<0.1	[NT]	[NT]	[NT]	[NT]	112	[NT]
Benzo(a)anthracene	mg/kg	0.1	Org-012	<0.1	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]
Chrysene	mg/kg	0.1	Org-012	<0.1	[NT]	[NT]	[NT]	[NT]	128	[NT]
Benzo(b,j+k)fluoranthene	mg/kg	0.2	Org-012	<0.2	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]
Benzo(a)pyrene	mg/kg	0.05	Org-012	<0.05	[NT]	[NT]	[NT]	[NT]	110	[NT]
Indeno(1,2,3-c,d)pyrene	mg/kg	0.1	Org-012	<0.1	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]
Dibenzo(a,h)anthracene	mg/kg	0.1	Org-012	<0.1	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]
Benzo(g,h,i)perylene	mg/kg	0.1	Org-012	<0.1	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]
Surrogate p-Terphenyl-d14	%		Org-012	97	[NT]	[NT]	[NT]	[NT]	96	[NT]

QUALITY CONTROL: Organochlorine Pesticides in soil					Duplicate				Spike Recovery %	
Test Description	Units	PQL	Method	Blank	#	Base	Dup.	RPD	LCS-8	[NT]
Date extracted	-			24/04/2019	[NT]	[NT]	[NT]	[NT]	24/04/2019	[NT]
Date analysed	-			24/04/2019	[NT]	[NT]	[NT]	[NT]	24/04/2019	[NT]
HCB	mg/kg	0.1	Org-005	<0.1	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]
alpha-BHC	mg/kg	0.1	Org-005	<0.1	[NT]	[NT]	[NT]	[NT]	98	[NT]
gamma-BHC	mg/kg	0.1	Org-005	<0.1	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]
beta-BHC	mg/kg	0.1	Org-005	<0.1	[NT]	[NT]	[NT]	[NT]	101	[NT]
Heptachlor	mg/kg	0.1	Org-005	<0.1	[NT]	[NT]	[NT]	[NT]	99	[NT]
delta-BHC	mg/kg	0.1	Org-005	<0.1	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]
Aldrin	mg/kg	0.1	Org-005	<0.1	[NT]	[NT]	[NT]	[NT]	94	[NT]
Heptachlor Epoxide	mg/kg	0.1	Org-005	<0.1	[NT]	[NT]	[NT]	[NT]	100	[NT]
gamma-Chlordane	mg/kg	0.1	Org-005	<0.1	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]
alpha-chlordane	mg/kg	0.1	Org-005	<0.1	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]
Endosulfan I	mg/kg	0.1	Org-005	<0.1	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]
pp-DDE	mg/kg	0.1	Org-005	<0.1	[NT]	[NT]	[NT]	[NT]	99	[NT]
Dieldrin	mg/kg	0.1	Org-005	<0.1	[NT]	[NT]	[NT]	[NT]	109	[NT]
Endrin	mg/kg	0.1	Org-005	<0.1	[NT]	[NT]	[NT]	[NT]	99	[NT]
pp-DDD	mg/kg	0.1	Org-005	<0.1	[NT]	[NT]	[NT]	[NT]	99	[NT]
Endosulfan II	mg/kg	0.1	Org-005	<0.1	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]
pp-DDT	mg/kg	0.1	Org-005	<0.1	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]
Endrin Aldehyde	mg/kg	0.1	Org-005	<0.1	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]
Endosulfan Sulphate	mg/kg	0.1	Org-005	<0.1	[NT]	[NT]	[NT]	[NT]	101	[NT]
Methoxychlor	mg/kg	0.1	Org-005	<0.1	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]
Surrogate TCMX	%		Org-005	93	[NT]	[NT]	[NT]	[NT]	86	[NT]

QUALITY CONTROL: Organophosphorus Pesticides					Duplicate				Spike Recovery %	
Test Description	Units	PQL	Method	Blank	#	Base	Dup.	RPD	LCS-8	[NT]
Date extracted	-			24/04/2019	[NT]	[NT]	[NT]	[NT]	24/04/2019	[NT]
Date analysed	-			24/04/2019	[NT]	[NT]	[NT]	[NT]	24/04/2019	[NT]
Azinphos-methyl (Guthion)	mg/kg	0.1	Org-008	<0.1	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]
Bromophos-ethyl	mg/kg	0.1	Org-008	<0.1	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]
Chlorpyriphos	mg/kg	0.1	Org-008	<0.1	[NT]	[NT]	[NT]	[NT]	110	[NT]
Chlorpyriphos-methyl	mg/kg	0.1	Org-008	<0.1	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]
Diazinon	mg/kg	0.1	Org-008	<0.1	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]
Dichlorvos	mg/kg	0.1	Org-008	<0.1	[NT]	[NT]	[NT]	[NT]	92	[NT]
Dimethoate	mg/kg	0.1	Org-008	<0.1	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]
Ethion	mg/kg	0.1	Org-008	<0.1	[NT]	[NT]	[NT]	[NT]	98	[NT]
Fenitrothion	mg/kg	0.1	Org-008	<0.1	[NT]	[NT]	[NT]	[NT]	112	[NT]
Malathion	mg/kg	0.1	Org-008	<0.1	[NT]	[NT]	[NT]	[NT]	94	[NT]
Parathion	mg/kg	0.1	Org-008	<0.1	[NT]	[NT]	[NT]	[NT]	113	[NT]
Ronnel	mg/kg	0.1	Org-008	<0.1	[NT]	[NT]	[NT]	[NT]	105	[NT]
Surrogate TCMX	%		Org-008	93	[NT]	[NT]	[NT]	[NT]	92	[NT]

QUALITY CONTROL: PCBs in Soil					Duplicate				Spike Recovery %	
Test Description	Units	PQL	Method	Blank	#	Base	Dup.	RPD	LCS-8	[NT]
Date extracted	-			24/04/2019	[NT]	[NT]	[NT]	[NT]	24/04/2019	[NT]
Date analysed	-			24/04/2019	[NT]	[NT]	[NT]	[NT]	24/04/2019	[NT]
Aroclor 1016	mg/kg	0.1	Org-006	<0.1	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]
Aroclor 1221	mg/kg	0.1	Org-006	<0.1	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]
Aroclor 1232	mg/kg	0.1	Org-006	<0.1	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]
Aroclor 1242	mg/kg	0.1	Org-006	<0.1	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]
Aroclor 1248	mg/kg	0.1	Org-006	<0.1	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]
Aroclor 1254	mg/kg	0.1	Org-006	<0.1	[NT]	[NT]	[NT]	[NT]	102	[NT]
Aroclor 1260	mg/kg	0.1	Org-006	<0.1	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]
Surrogate TCLMX	%		Org-006	93	[NT]	[NT]	[NT]	[NT]	92	[NT]

QUALITY CONTROL: Total PCBs in Soil						Duplicate			Spike Recovery %	
Test Description	Units	PQL	Method	Blank	#	Base	Dup.	RPD	LCS-8	[NT]
Date extracted	-			24/04/2019	1	24/04/2019	24/04/2019		24/04/2019	[NT]
Date analysed	-			24/04/2019	1	24/04/2019	24/04/2019		24/04/2019	[NT]
Total PCB (Aroclor 1016-1260)	mg/kg	0.6	Org-006	<0.6	1	1.8	2.1	15	102	[NT]
Surrogate TCLMX	%		Org-006	93	1	92	110	18	99	[NT]

QUALITY CONTROL: Acid Extractable metals in soil					Duplicate				Spike Recovery %	
Test Description	Units	PQL	Method	Blank	#	Base	Dup.	RPD	LCS-8	[NT]
Date prepared	-			24/04/2019	[NT]	[NT]	[NT]	[NT]	24/04/2019	[NT]
Date analysed	-			24/04/2019	[NT]	[NT]	[NT]	[NT]	24/04/2019	[NT]
Arsenic	mg/kg	4	Metals-020	<4	[NT]	[NT]	[NT]	[NT]	105	[NT]
Cadmium	mg/kg	0.4	Metals-020	<0.4	[NT]	[NT]	[NT]	[NT]	109	[NT]
Chromium	mg/kg	1	Metals-020	<1	[NT]	[NT]	[NT]	[NT]	109	[NT]
Copper	mg/kg	1	Metals-020	<1	[NT]	[NT]	[NT]	[NT]	109	[NT]
Lead	mg/kg	1	Metals-020	<1	[NT]	[NT]	[NT]	[NT]	106	[NT]
Mercury	mg/kg	0.1	Metals-021	<0.1	[NT]	[NT]	[NT]	[NT]	90	[NT]
Nickel	mg/kg	1	Metals-020	<1	[NT]	[NT]	[NT]	[NT]	104	[NT]
Zinc	mg/kg	1	Metals-020	<1	[NT]	[NT]	[NT]	[NT]	105	[NT]

QUALITY CONTROL: PFAS in Soils Short					Duplicate				Spike Recovery %	
Test Description	Units	PQL	Method	Blank	#	Base	Dup.	RPD	LCS-8	[NT]
Date prepared	-			24/04/2019	[NT]	[NT]	[NT]	[NT]	24/04/2019	[NT]
Date analysed	-			24/04/2019	[NT]	[NT]	[NT]	[NT]	24/04/2019	[NT]
Perfluorohexanesulfonic acid - PFHxS	µg/kg	0.1	Org-035	<0.1	[NT]	[NT]	[NT]	[NT]	110	[NT]
Perfluorooctanesulfonic acid PFOS	µg/kg	0.1	Org-035	<0.1	[NT]	[NT]	[NT]	[NT]	119	[NT]
Perfluorooctanoic acid PFOA	µg/kg	0.1	Org-035	<0.1	[NT]	[NT]	[NT]	[NT]	89	[NT]
6:2 FTS	µg/kg	0.1	Org-035	<0.1	[NT]	[NT]	[NT]	[NT]	101	[NT]
8:2 FTS	µg/kg	0.1	Org-035	<0.1	[NT]	[NT]	[NT]	[NT]	94	[NT]
Surrogate $^{13}C_8$ *PFOS*	%		Org-035	100	[NT]	[NT]	[NT]	[NT]	117	[NT]
Surrogate $^{13}C_2$ *PFOA*	%		Org-035	105	[NT]	[NT]	[NT]	[NT]	99	[NT]
Extracted ISTD $^{18}O_2$ *PFHxS*	%		Org-035	85	[NT]	[NT]	[NT]	[NT]	81	[NT]
Extracted ISTD $^{13}C_4$ *PFOS*	%		Org-035	100	[NT]	[NT]	[NT]	[NT]	85	[NT]
Extracted ISTD $^{13}C_4$ *PFOA*	%		Org-035	84	[NT]	[NT]	[NT]	[NT]	88	[NT]
Extracted ISTD $^{13}C_2$ *6:2FTS*	%		Org-035	86	[NT]	[NT]	[NT]	[NT]	80	[NT]
Extracted ISTD $^{13}C_2$ *8:2FTS*	%		Org-035	84	[NT]	[NT]	[NT]	[NT]	86	[NT]

Result Definitions

NT	Not tested
NA	Test not required
INS	Insufficient sample for this test
PQL	Practical Quantitation Limit
<	Less than
>	Greater than
RPD	Relative Percent Difference
LCS	Laboratory Control Sample
NS	Not specified
NEPM	National Environmental Protection Measure
NR	Not Reported

Quality Control Definitions

Blank	This is the component of the analytical signal which is not derived from the sample but from reagents, glassware etc, can be determined by processing solvents and reagents in exactly the same manner as for samples.
Duplicate	This is the complete duplicate analysis of a sample from the process batch. If possible, the sample selected should be one where the analyte concentration is easily measurable.
Matrix Spike	A portion of the sample is spiked with a known concentration of target analyte. The purpose of the matrix spike is to monitor the performance of the analytical method used and to determine whether matrix interferences exist.
LCS (Laboratory Control Sample)	This comprises either a standard reference material or a control matrix (such as a blank sand or water) fortified with analytes representative of the analyte class. It is simply a check sample.
Surrogate Spike	Surrogates are known additions to each sample, blank, matrix spike and LCS in a batch, of compounds which are similar to the analyte of interest, however are not expected to be found in real samples.

Australian Drinking Water Guidelines recommend that Thermotolerant Coliform, Faecal Enterococci, & E.Coli levels are less than 1cfu/100mL. The recommended maximums are taken from "Australian Drinking Water Guidelines", published by NHMRC & ARMC 2011.

Laboratory Acceptance Criteria

Duplicate sample and matrix spike recoveries may not be reported on smaller jobs, however, were analysed at a frequency to meet or exceed NEPM requirements. All samples are tested in batches of 20. The duplicate sample RPD and matrix spike recoveries for the batch were within the laboratory acceptance criteria.

Filters, swabs, wipes, tubes and badges will not have duplicate data as the whole sample is generally extracted during sample extraction.

Spikes for Physical and Aggregate Tests are not applicable.

For VOCs in water samples, three vials are required for duplicate or spike analysis.

Duplicates: >10xPQL - RPD acceptance criteria will vary depending on the analytes and the analytical techniques but is typically in the range 20%-50% – see ELN-P05 QA/QC tables for details; <10xPQL - RPD are higher as the results approach PQL and the estimated measurement uncertainty will statistically increase.

Matrix Spikes, LCS and Surrogate recoveries: Generally 70-130% for inorganics/metals; 60-140% for organics (+/-50% surrogates) and 10-140% for labile SVOCs (including labile surrogates), ultra trace organics and speciated phenols is acceptable.

In circumstances where no duplicate and/or sample spike has been reported at 1 in 10 and/or 1 in 20 samples respectively, the sample volume submitted was insufficient in order to satisfy laboratory QA/QC protocols.

When samples are received where certain analytes are outside of recommended technical holding times (THTs), the analysis has proceeded. Where analytes are on the verge of breaching THTs, every effort will be made to analyse within the THT or as soon as practicable.

Where sampling dates are not provided, Envirolab are not in a position to comment on the validity of the analysis where recommended technical holding times may have been breached.

Measurement Uncertainty estimates are available for most tests upon request.

Report Comments

For PFAS Extracted Internal Standards denoted with # or outside the 50-150% acceptance range, the respective target analyte results may be unaffected, in other circumstances the PQL has been raised to accommodate the outlier(s).

ANALYTICAL REPORT

Accreditation No. 2562

CLIENT DETAILS

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Project	**J17188**
Order Number	(Not specified)
Samples	41

LABORATORY DETAILS

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SGS Reference	**SE192028 R1**
Date Received	24/4/2019
Date Reported	9/5/2019

COMMENTS

Accredited for compliance with ISO/IEC 17025 - Testing. NATA accredited laboratory 2562(4354).

This report cancels and supersedes the report No. SE192028 R0 dated 30.04.19 issued by SGS Environment, Health and Safety due to modifying the project number.

No respirable fibres detected in all soil samples using trace analysis technique.

Asbestos analysed by approved identifiers Ravee Sivasubramaniam and Yusuf Kuthpudin .

SIGNATORIES

Akheeqar Beniameen
Chemist

Huong Crawford
Production Manager

Kamrul Ahsan
Senior Chemist

Ly Kim Ha
Organic Section Head

S. Ravendran.

Ravee Sivasubramaniam
Hygiene Team Leader

VOC's in Soil [AN433] Tested: 26/4/2019

PARAMETER	UOM	LOR	S01_0-0.1 SOIL - 17/4/2019 SE192028.001	S02_0-0.1 SOIL - 17/4/2019 SE192028.002	S02_0.4-0.5 SOIL - 17/4/2019 SE192028.003	S03_0-0.1 SOIL - 17/4/2019 SE192028.004	S04_0-0.1 SOIL - 17/4/2019 SE192028.005
Benzene	mg/kg	0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Toluene	mg/kg	0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Ethylbenzene	mg/kg	0.1	<0.1	<0.1	<0.1	<0.1	<0.1
m/p-xylene	mg/kg	0.2	<0.2	<0.2	<0.2	<0.2	<0.2
o-xylene	mg/kg	0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Total Xylenes	mg/kg	0.3	<0.3	<0.3	<0.3	<0.3	<0.3
Total BTEX	mg/kg	0.6	<0.6	<0.6	<0.6	<0.6	<0.6
Naphthalene	mg/kg	0.1	<0.1	<0.1	<0.1	<0.1	<0.1

PARAMETER	UOM	LOR	S04_-0.4-0.5 SOIL - 17/4/2019 SE192028.006	S05_0-0.1 SOIL - 17/4/2019 SE192028.007	S05_0.4-0.5 SOIL - 17/4/2019 SE192028.008	S06_0-0.1 SOIL - 17/4/2019 SE192028.009	S06_0.4-0.5 SOIL - 17/4/2019 SE192028.010
Benzene	mg/kg	0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Toluene	mg/kg	0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Ethylbenzene	mg/kg	0.1	<0.1	<0.1	<0.1	<0.1	<0.1
m/p-xylene	mg/kg	0.2	<0.2	<0.2	<0.2	<0.2	<0.2
o-xylene	mg/kg	0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Total Xylenes	mg/kg	0.3	<0.3	<0.3	<0.3	<0.3	<0.3
Total BTEX	mg/kg	0.6	<0.6	<0.6	<0.6	<0.6	<0.6
Naphthalene	mg/kg	0.1	<0.1	<0.1	<0.1	<0.1	<0.1

PARAMETER	UOM	LOR	S07_0-0.1 SOIL - 17/4/2019 SE192028.011	S08_0-0.1 SOIL - 17/4/2019 SE192028.012	S08_0.3-0.4 SOIL - 17/4/2019 SE192028.013	S09_0-0.1 SOIL - 17/4/2019 SE192028.014	S10_0-0.1 SOIL - 17/4/2019 SE192028.015
Benzene	mg/kg	0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Toluene	mg/kg	0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Ethylbenzene	mg/kg	0.1	<0.1	<0.1	<0.1	<0.1	<0.1
m/p-xylene	mg/kg	0.2	<0.2	<0.2	<0.2	<0.2	<0.2
o-xylene	mg/kg	0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Total Xylenes	mg/kg	0.3	<0.3	<0.3	<0.3	<0.3	<0.3
Total BTEX	mg/kg	0.6	<0.6	<0.6	<0.6	<0.6	<0.6
Naphthalene	mg/kg	0.1	<0.1	<0.1	<0.1	<0.1	<0.1

PARAMETER	UOM	LOR	S11_0-0.1 SOIL - 17/4/2019 SE192028.016	S11_0.4-0.5 SOIL - 17/4/2019 SE192028.017	S12_0-0.1 SOIL - 17/4/2019 SE192028.018	S13_0-0.1 SOIL - 17/4/2019 SE192028.019	S14_0-0.1 SOIL - 17/4/2019 SE192028.020
Benzene	mg/kg	0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Toluene	mg/kg	0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Ethylbenzene	mg/kg	0.1	<0.1	<0.1	<0.1	<0.1	<0.1
m/p-xylene	mg/kg	0.2	<0.2	<0.2	<0.2	<0.2	<0.2
o-xylene	mg/kg	0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Total Xylenes	mg/kg	0.3	<0.3	<0.3	<0.3	<0.3	<0.3
Total BTEX	mg/kg	0.6	<0.6	<0.6	<0.6	<0.6	<0.6
Naphthalene	mg/kg	0.1	<0.1	<0.1	<0.1	<0.1	<0.1

VOC's in Soil [AN433] Tested: 26/4/2019 (continued)

PARAMETER	UOM	LOR	S14_0.4-0.5 SOIL - 17/4/2019 SE192028.021	S15_0-0.1 SOIL - 17/4/2019 SE192028.022	S16_0-0.1 SOIL - 17/4/2019 SE192028.023	S17_0-0.1 SOIL - 17/4/2019 SE192028.024	S18_0-0.1 SOIL - 17/4/2019 SE192028.025
Benzene	mg/kg	0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Toluene	mg/kg	0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Ethylbenzene	mg/kg	0.1	<0.1	<0.1	<0.1	<0.1	<0.1
m/p-xylene	mg/kg	0.2	<0.2	<0.2	<0.2	<0.2	<0.2
o-xylene	mg/kg	0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Total Xylenes	mg/kg	0.3	<0.3	<0.3	<0.3	<0.3	<0.3
Total BTEX	mg/kg	0.6	<0.6	<0.6	<0.6	<0.6	<0.6
Naphthalene	mg/kg	0.1	<0.1	<0.1	<0.1	<0.1	<0.1

PARAMETER	UOM	LOR	S19_0-0.1 SOIL - 17/4/2019 SE192028.026	S19_0.4-0.5 SOIL - 17/4/2019 SE192028.027	S20_0-0.1 SOIL - 17/4/2019 SE192028.028	S20_0.4-0.5 SOIL - 17/4/2019 SE192028.029	S21_0-0.1 SOIL - 17/4/2019 SE192028.030
Benzene	mg/kg	0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Toluene	mg/kg	0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Ethylbenzene	mg/kg	0.1	<0.1	<0.1	<0.1	<0.1	<0.1
m/p-xylene	mg/kg	0.2	<0.2	<0.2	<0.2	<0.2	<0.2
o-xylene	mg/kg	0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Total Xylenes	mg/kg	0.3	<0.3	<0.3	<0.3	<0.3	<0.3
Total BTEX	mg/kg	0.6	<0.6	<0.6	<0.6	<0.6	<0.6
Naphthalene	mg/kg	0.1	<0.1	<0.1	<0.1	<0.1	<0.1

PARAMETER	UOM	LOR	S22_0-0.1 SOIL - 17/4/2019 SE192028.031	S23_0-0.1 SOIL - 17/4/2019 SE192028.032	S24_0-0.1 SOIL - 17/4/2019 SE192028.033	S25_0-0.2 SOIL - 17/4/2019 SE192028.034	S26_0-0.2 SOIL - 17/4/2019 SE192028.035
Benzene	mg/kg	0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Toluene	mg/kg	0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Ethylbenzene	mg/kg	0.1	<0.1	<0.1	<0.1	<0.1	<0.1
m/p-xylene	mg/kg	0.2	<0.2	<0.2	<0.2	<0.2	<0.2
o-xylene	mg/kg	0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Total Xylenes	mg/kg	0.3	<0.3	<0.3	<0.3	<0.3	<0.3
Total BTEX	mg/kg	0.6	<0.6	<0.6	<0.6	<0.6	<0.6
Naphthalene	mg/kg	0.1	<0.1	<0.1	<0.1	<0.1	<0.1

PARAMETER	UOM	LOR	QC01 SOIL - 17/4/2019 SE192028.036	QC03 SOIL - 17/4/2019 SE192028.037	TB01 SOIL - 17/4/2019 SE192028.039	TS01 SOIL - 17/4/2019 SE192028.040
Benzene	mg/kg	0.1	<0.1	<0.1	<0.1	[80%]
Toluene	mg/kg	0.1	<0.1	<0.1	<0.1	[83%]
Ethylbenzene	mg/kg	0.1	<0.1	<0.1	<0.1	[94%]
m/p-xylene	mg/kg	0.2	<0.2	<0.2	<0.2	[83%]
o-xylene	mg/kg	0.1	<0.1	<0.1	<0.1	[98%]
Total Xylenes	mg/kg	0.3	<0.3	<0.3	<0.3	-
Total BTEX	mg/kg	0.6	<0.6	<0.6	<0.6	-
Naphthalene	mg/kg	0.1	<0.1	<0.1	<0.1	-

Volatile Petroleum Hydrocarbons in Soil [AN433] Tested: 26/4/2019

PARAMETER	UOM	LOR	S01_0-0.1 SOIL - 17/4/2019 SE192028.001	S02_0-0.1 SOIL - 17/4/2019 SE192028.002	S02_0.4-0.5 SOIL - 17/4/2019 SE192028.003	S03_0-0.1 SOIL - 17/4/2019 SE192028.004	S04_0-0.1 SOIL - 17/4/2019 SE192028.005
TRH C6-C9	mg/kg	20	<20	<20	<20	<20	<20
Benzene (F0)	mg/kg	0.1	<0.1	<0.1	<0.1	<0.1	<0.1
TRH C6-C10	mg/kg	25	<25	<25	<25	<25	<25
TRH C6-C10 minus BTEX (F1)	mg/kg	25	<25	<25	<25	<25	<25

PARAMETER	UOM	LOR	S04_-0.4-0.5 SOIL - 17/4/2019 SE192028.006	S05_0-0.1 SOIL - 17/4/2019 SE192028.007	S05_0.4-0.5 SOIL - 17/4/2019 SE192028.008	S06_0-0.1 SOIL - 17/4/2019 SE192028.009	S06_0.4-0.5 SOIL - 17/4/2019 SE192028.010
TRH C6-C9	mg/kg	20	<20	<20	<20	<20	<20
Benzene (F0)	mg/kg	0.1	<0.1	<0.1	<0.1	<0.1	<0.1
TRH C6-C10	mg/kg	25	<25	<25	<25	<25	<25
TRH C6-C10 minus BTEX (F1)	mg/kg	25	<25	<25	<25	<25	<25

PARAMETER	UOM	LOR	S07_0-0.1 SOIL - 17/4/2019 SE192028.011	S08_0-0.1 SOIL - 17/4/2019 SE192028.012	S08_0.3-0.4 SOIL - 17/4/2019 SE192028.013	S09_0-0.1 SOIL - 17/4/2019 SE192028.014	S10_0-0.1 SOIL - 17/4/2019 SE192028.015
TRH C6-C9	mg/kg	20	<20	<20	<20	<20	<20
Benzene (F0)	mg/kg	0.1	<0.1	<0.1	<0.1	<0.1	<0.1
TRH C6-C10	mg/kg	25	<25	<25	<25	<25	<25
TRH C6-C10 minus BTEX (F1)	mg/kg	25	<25	<25	<25	<25	<25

PARAMETER	UOM	LOR	S11_0-0.1 SOIL - 17/4/2019 SE192028.016	S11_0.4-0.5 SOIL - 17/4/2019 SE192028.017	S12_0-0.1 SOIL - 17/4/2019 SE192028.018	S13_0-0.1 SOIL - 17/4/2019 SE192028.019	S14_0-0.1 SOIL - 17/4/2019 SE192028.020
TRH C6-C9	mg/kg	20	<20	<20	<20	<20	<20
Benzene (F0)	mg/kg	0.1	<0.1	<0.1	<0.1	<0.1	<0.1
TRH C6-C10	mg/kg	25	<25	<25	<25	<25	<25
TRH C6-C10 minus BTEX (F1)	mg/kg	25	<25	<25	<25	<25	<25

PARAMETER	UOM	LOR	S14_0.4-0.5 SOIL - 17/4/2019 SE192028.021	S15_0-0.1 SOIL - 17/4/2019 SE192028.022	S16_0-0.1 SOIL - 17/4/2019 SE192028.023	S17_0-0.1 SOIL - 17/4/2019 SE192028.024	S18_0-0.1 SOIL - 17/4/2019 SE192028.025
TRH C6-C9	mg/kg	20	<20	<20	<20	<20	<20
Benzene (F0)	mg/kg	0.1	<0.1	<0.1	<0.1	<0.1	<0.1
TRH C6-C10	mg/kg	25	<25	<25	<25	<25	<25
TRH C6-C10 minus BTEX (F1)	mg/kg	25	<25	<25	<25	<25	<25

PARAMETER	UOM	LOR	S19_0-0.1 SOIL - 17/4/2019 SE192028.026	S19_0.4-0.5 SOIL - 17/4/2019 SE192028.027	S20_0-0.1 SOIL - 17/4/2019 SE192028.028	S20_0.4-0.5 SOIL - 17/4/2019 SE192028.029	S21_0-0.1 SOIL - 17/4/2019 SE192028.030
TRH C6-C9	mg/kg	20	<20	<20	<20	<20	<20
Benzene (F0)	mg/kg	0.1	<0.1	<0.1	<0.1	<0.1	<0.1
TRH C6-C10	mg/kg	25	<25	<25	<25	<25	<25
TRH C6-C10 minus BTEX (F1)	mg/kg	25	<25	<25	<25	<25	<25

Volatile Petroleum Hydrocarbons in Soil [AN433] Tested: 26/4/2019 (continued)

PARAMETER	UOM	LOR	S22_0-0.1 SOIL - 17/4/2019 SE192028.031	S23_0-0.1 SOIL - 17/4/2019 SE192028.032	S24_0-0.1 SOIL - 17/4/2019 SE192028.033	S25_0-0.2 SOIL - 17/4/2019 SE192028.034	S26_0-0.2 SOIL - 17/4/2019 SE192028.035
TRH C6-C9	mg/kg	20	<20	<20	<20	<20	<20
Benzene (F0)	mg/kg	0.1	<0.1	<0.1	<0.1	<0.1	<0.1
TRH C6-C10	mg/kg	25	<25	<25	<25	<25	<25
TRH C6-C10 minus BTEX (F1)	mg/kg	25	<25	<25	<25	<25	<25

PARAMETER	UOM	LOR	QC01 SOIL - 17/4/2019 SE192028.036	QC03 SOIL - 17/4/2019 SE192028.037	TB01 SOIL - 17/4/2019 SE192028.039
TRH C6-C9	mg/kg	20	<20	<20	<20
Benzene (F0)	mg/kg	0.1	<0.1	<0.1	<0.1
TRH C6-C10	mg/kg	25	<25	<25	<25
TRH C6-C10 minus BTEX (F1)	mg/kg	25	<25	<25	<25

TRH (Total Recoverable Hydrocarbons) in Soil [AN403] Tested: 26/4/2019

			S01_0-0.1	S02_0-0.1	S02_0.4-0.5	S03_0-0.1	S04_0-0.1
			SOIL	SOIL	SOIL	SOIL	SOIL
			-	-	-	-	-
			17/4/2019	17/4/2019	17/4/2019	17/4/2019	17/4/2019
PARAMETER	**UOM**	**LOR**	**SE192028.001**	**SE192028.002**	**SE192028.003**	**SE192028.004**	**SE192028.005**
TRH C10-C14	mg/kg	20	<20	<20	<20	<20	<20
TRH C15-C28	mg/kg	45	<45	<45	<45	<45	<45
TRH C29-C36	mg/kg	45	72	<45	<45	<45	81
TRH C37-C40	mg/kg	100	<100	<100	<100	<100	<100
TRH >C10-C16	mg/kg	25	<25	<25	<25	<25	<25
TRH >C10-C16 - Naphthalene (F2)	mg/kg	25	<25	<25	<25	<25	<25
TRH >C16-C34 (F3)	mg/kg	90	<90	<90	<90	<90	<90
TRH >C34-C40 (F4)	mg/kg	120	<120	<120	<120	<120	<120
TRH C10-C36 Total	mg/kg	110	<110	<110	<110	<110	<110
TRH C10-C40 Total (F bands)	mg/kg	210	<210	<210	<210	<210	<210

			S04_-0.4-0.5	S05_0-0.1	S05_0.4-0.5	S06_0-0.1	S06_0.4-0.5
			SOIL	SOIL	SOIL	SOIL	SOIL
			-	-	-	-	-
			17/4/2019	17/4/2019	17/4/2019	17/4/2019	17/4/2019
PARAMETER	**UOM**	**LOR**	**SE192028.006**	**SE192028.007**	**SE192028.008**	**SE192028.009**	**SE192028.010**
TRH C10-C14	mg/kg	20	<20	<20	<20	<20	<20
TRH C15-C28	mg/kg	45	<45	120	<45	<45	<45
TRH C29-C36	mg/kg	45	<45	320	<45	58	<45
TRH C37-C40	mg/kg	100	<100	<100	<100	<100	<100
TRH >C10-C16	mg/kg	25	<25	<25	<25	<25	<25
TRH >C10-C16 - Naphthalene (F2)	mg/kg	25	<25	<25	<25	<25	<25
TRH >C16-C34 (F3)	mg/kg	90	<90	310	<90	<90	<90
TRH >C34-C40 (F4)	mg/kg	120	<120	200	<120	<120	<120
TRH C10-C36 Total	mg/kg	110	<110	440	<110	<110	<110
TRH C10-C40 Total (F bands)	mg/kg	210	<210	500	<210	<210	<210

			S07_0-0.1	S08_0-0.1	S08_0.3-0.4	S09_0-0.1	S10_0-0.1
			SOIL	SOIL	SOIL	SOIL	SOIL
			-	-	-	-	-
			17/4/2019	17/4/2019	17/4/2019	17/4/2019	17/4/2019
PARAMETER	**UOM**	**LOR**	**SE192028.011**	**SE192028.012**	**SE192028.013**	**SE192028.014**	**SE192028.015**
TRH C10-C14	mg/kg	20	<20	<20	<20	<20	<20
TRH C15-C28	mg/kg	45	<45	<45	<45	<45	64
TRH C29-C36	mg/kg	45	<45	<45	<45	56	160
TRH C37-C40	mg/kg	100	<100	<100	<100	<100	<100
TRH >C10-C16	mg/kg	25	<25	<25	<25	<25	<25
TRH >C10-C16 - Naphthalene (F2)	mg/kg	25	<25	<25	<25	<25	<25
TRH >C16-C34 (F3)	mg/kg	90	<90	<90	<90	<90	170
TRH >C34-C40 (F4)	mg/kg	120	<120	<120	<120	<120	<120
TRH C10-C36 Total	mg/kg	110	<110	<110	<110	<110	220
TRH C10-C40 Total (F bands)	mg/kg	210	<210	<210	<210	<210	<210

TRH (Total Recoverable Hydrocarbons) in Soil [AN403] Tested: 26/4/2019 (continued)

PARAMETER	UOM	LOR	S11_0-0.1 SOIL - 17/4/2019 SE192028.016	S11_0.4-0.5 SOIL - 17/4/2019 SE192028.017	S12_0-0.1 SOIL - 17/4/2019 SE192028.018	S13_0-0.1 SOIL - 17/4/2019 SE192028.019	S14_0-0.1 SOIL - 17/4/2019 SE192028.020
TRH C10-C14	mg/kg	20	<20	<20	<20	<20	<20
TRH C15-C28	mg/kg	45	<45	<45	<45	<45	<45
TRH C29-C36	mg/kg	45	54	<45	<45	<45	<45
TRH C37-C40	mg/kg	100	<100	<100	<100	<100	<100
TRH >C10-C16	mg/kg	25	<25	<25	<25	<25	<25
TRH >C10-C16 - Naphthalene (F2)	mg/kg	25	<25	<25	<25	<25	<25
TRH >C16-C34 (F3)	mg/kg	90	<90	<90	<90	<90	<90
TRH >C34-C40 (F4)	mg/kg	120	<120	<120	<120	<120	<120
TRH C10-C36 Total	mg/kg	110	<110	<110	<110	<110	<110
TRH C10-C40 Total (F bands)	mg/kg	210	<210	<210	<210	<210	<210

PARAMETER	UOM	LOR	S14_0.4-0.5 SOIL - 17/4/2019 SE192028.021	S15_0-0.1 SOIL - 17/4/2019 SE192028.022	S16_0-0.1 SOIL - 17/4/2019 SE192028.023	S17_0-0.1 SOIL - 17/4/2019 SE192028.024	S18_0-0.1 SOIL - 17/4/2019 SE192028.025
TRH C10-C14	mg/kg	20	<20	<20	<20	<20	<20
TRH C15-C28	mg/kg	45	<45	<45	<45	<45	<45
TRH C29-C36	mg/kg	45	<45	79	<45	53	<45
TRH C37-C40	mg/kg	100	<100	<100	<100	<100	<100
TRH >C10-C16	mg/kg	25	<25	<25	<25	<25	<25
TRH >C10-C16 - Naphthalene (F2)	mg/kg	25	<25	<25	<25	<25	<25
TRH >C16-C34 (F3)	mg/kg	90	<90	<90	<90	<90	<90
TRH >C34-C40 (F4)	mg/kg	120	<120	<120	<120	<120	<120
TRH C10-C36 Total	mg/kg	110	<110	<110	<110	<110	<110
TRH C10-C40 Total (F bands)	mg/kg	210	<210	<210	<210	<210	<210

PARAMETER	UOM	LOR	S19_0-0.1 SOIL - 17/4/2019 SE192028.026	S19_0.4-0.5 SOIL - 17/4/2019 SE192028.027	S20_0-0.1 SOIL - 17/4/2019 SE192028.028	S20_0.4-0.5 SOIL - 17/4/2019 SE192028.029	S21_0-0.1 SOIL - 17/4/2019 SE192028.030
TRH C10-C14	mg/kg	20	<20	<20	<20	<20	<20
TRH C15-C28	mg/kg	45	<45	<45	<45	<45	<45
TRH C29-C36	mg/kg	45	<45	<45	<45	<45	170
TRH C37-C40	mg/kg	100	<100	<100	<100	<100	<100
TRH >C10-C16	mg/kg	25	<25	<25	<25	<25	<25
TRH >C10-C16 - Naphthalene (F2)	mg/kg	25	<25	<25	<25	<25	<25
TRH >C16-C34 (F3)	mg/kg	90	<90	<90	<90	<90	<90
TRH >C34-C40 (F4)	mg/kg	120	<120	<120	<120	<120	<120
TRH C10-C36 Total	mg/kg	110	<110	<110	<110	<110	170
TRH C10-C40 Total (F bands)	mg/kg	210	<210	<210	<210	<210	<210

TRH (Total Recoverable Hydrocarbons) in Soil [AN403] Tested: 26/4/2019 (continued)

PARAMETER	UOM	LOR	S22_0-0.1 SOIL - 17/4/2019 SE192028.031	S23_0-0.1 SOIL - 17/4/2019 SE192028.032	S24_0-0.1 SOIL - 17/4/2019 SE192028.033	S25_0-0.2 SOIL - 17/4/2019 SE192028.034	S26_0-0.2 SOIL - 17/4/2019 SE192028.035
TRH C10-C14	mg/kg	20	<20	<20	<20	<20	29
TRH C15-C28	mg/kg	45	<45	<45	<45	<45	11000
TRH C29-C36	mg/kg	45	62	<45	<45	<45	11000
TRH C37-C40	mg/kg	100	<100	<100	<100	<100	2000
TRH >C10-C16	mg/kg	25	<25	<25	<25	<25	150
TRH >C10-C16 - Naphthalene (F2)	mg/kg	25	<25	<25	<25	<25	150
TRH >C16-C34 (F3)	mg/kg	90	<90	<90	<90	<90	19000
TRH >C34-C40 (F4)	mg/kg	120	<120	<120	<120	<120	4600
TRH C10-C36 Total	mg/kg	110	<110	<110	<110	<110	22000
TRH C10-C40 Total (F bands)	mg/kg	210	<210	<210	<210	<210	24000

PARAMETER	UOM	LOR	QC01 SOIL - 17/4/2019 SE192028.036	QC03 SOIL - 17/4/2019 SE192028.037
TRH C10-C14	mg/kg	20	<20	<20
TRH C15-C28	mg/kg	45	150	<45
TRH C29-C36	mg/kg	45	440	97
TRH C37-C40	mg/kg	100	<100	<100
TRH >C10-C16	mg/kg	25	<25	<25
TRH >C10-C16 - Naphthalene (F2)	mg/kg	25	<25	<25
TRH >C16-C34 (F3)	mg/kg	90	410	<90
TRH >C34-C40 (F4)	mg/kg	120	240	<120
TRH C10-C36 Total	mg/kg	110	580	<110
TRH C10-C40 Total (F bands)	mg/kg	210	660	<210

PAH (Polynuclear Aromatic Hydrocarbons) in Soil [AN420] Tested: 26/4/2019

PARAMETER	UOM	LOR	S02_0-0.1 SOIL - 17/4/2019 SE192028.002	S02_0.4-0.5 SOIL - 17/4/2019 SE192028.003	S05_0-0.1 SOIL - 17/4/2019 SE192028.007	S05_0.4-0.5 SOIL - 17/4/2019 SE192028.008	S07_0-0.1 SOIL - 17/4/2019 SE192028.011
Naphthalene	mg/kg	0.1	<0.1	<0.1	<0.1	<0.1	<0.1
2-methylnaphthalene	mg/kg	0.1	<0.1	<0.1	<0.1	<0.1	<0.1
1-methylnaphthalene	mg/kg	0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Acenaphthylene	mg/kg	0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Acenaphthene	mg/kg	0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Fluorene	mg/kg	0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Phenanthrene	mg/kg	0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Anthracene	mg/kg	0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Fluoranthene	mg/kg	0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Pyrene	mg/kg	0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Benzo(a)anthracene	mg/kg	0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Chrysene	mg/kg	0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Benzo(b&j)fluoranthene	mg/kg	0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Benzo(k)fluoranthene	mg/kg	0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Benzo(a)pyrene	mg/kg	0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Indeno(1,2,3-cd)pyrene	mg/kg	0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Dibenzo(ah)anthracene	mg/kg	0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Benzo(ghi)perylene	mg/kg	0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Carcinogenic PAHs, BaP TEQ <LOR=0	TEQ (mg/kg)	0.2	<0.2	<0.2	<0.2	<0.2	<0.2
Carcinogenic PAHs, BaP TEQ <LOR=LOR	TEQ (mg/kg)	0.3	<0.3	<0.3	<0.3	<0.3	<0.3
Carcinogenic PAHs, BaP TEQ <LOR=LOR/2	TEQ (mg/kg)	0.2	<0.2	<0.2	<0.2	<0.2	<0.2
Total PAH (18)	mg/kg	0.8	<0.8	<0.8	<0.8	<0.8	<0.8
Total PAH (NEPM/WHO 16)	mg/kg	0.8	<0.8	<0.8	<0.8	<0.8	<0.8

PARAMETER	UOM	LOR	S08_0-0.1 SOIL - 17/4/2019 SE192028.012	S08_0.3-0.4 SOIL - 17/4/2019 SE192028.013	S11_0-0.1 SOIL - 17/4/2019 SE192028.016	S11_0.4-0.5 SOIL - 17/4/2019 SE192028.017	S12_0-0.1 SOIL - 17/4/2019 SE192028.018
Naphthalene	mg/kg	0.1	<0.1	<0.1	<0.1	<0.1	<0.1
2-methylnaphthalene	mg/kg	0.1	<0.1	<0.1	<0.1	<0.1	<0.1
1-methylnaphthalene	mg/kg	0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Acenaphthylene	mg/kg	0.1	<0.1	<0.1	<0.1	0.3	<0.1
Acenaphthene	mg/kg	0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Fluorene	mg/kg	0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Phenanthrene	mg/kg	0.1	<0.1	<0.1	<0.1	0.1	<0.1
Anthracene	mg/kg	0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Fluoranthene	mg/kg	0.1	<0.1	<0.1	<0.1	0.2	<0.1
Pyrene	mg/kg	0.1	<0.1	<0.1	<0.1	0.2	<0.1
Benzo(a)anthracene	mg/kg	0.1	<0.1	<0.1	<0.1	0.2	<0.1
Chrysene	mg/kg	0.1	<0.1	<0.1	<0.1	0.3	<0.1
Benzo(b&j)fluoranthene	mg/kg	0.1	<0.1	<0.1	<0.1	0.3	<0.1
Benzo(k)fluoranthene	mg/kg	0.1	<0.1	<0.1	<0.1	0.1	<0.1
Benzo(a)pyrene	mg/kg	0.1	<0.1	<0.1	<0.1	0.3	<0.1
Indeno(1,2,3-cd)pyrene	mg/kg	0.1	<0.1	<0.1	<0.1	0.2	<0.1
Dibenzo(ah)anthracene	mg/kg	0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Benzo(ghi)perylene	mg/kg	0.1	<0.1	<0.1	<0.1	0.3	<0.1
Carcinogenic PAHs, BaP TEQ <LOR=0	TEQ (mg/kg)	0.2	<0.2	<0.2	<0.2	0.4	<0.2
Carcinogenic PAHs, BaP TEQ <LOR=LOR	TEQ (mg/kg)	0.3	<0.3	<0.3	<0.3	0.5	<0.3
Carcinogenic PAHs, BaP TEQ <LOR=LOR/2	TEQ (mg/kg)	0.2	<0.2	<0.2	<0.2	0.4	<0.2
Total PAH (18)	mg/kg	0.8	<0.8	<0.8	<0.8	2.5	<0.8
Total PAH (NEPM/WHO 16)	mg/kg	0.8	<0.8	<0.8	<0.8	2.5	<0.8

PAH (Polynuclear Aromatic Hydrocarbons) in Soil [AN420] Tested: 26/4/2019 (continued)

PARAMETER	UOM	LOR	S14_0-0.1 SOIL - 17/4/2019 SE192028.020	S14_0.4-0.5 SOIL - 17/4/2019 SE192028.021	S15_0-0.1 SOIL - 17/4/2019 SE192028.022	S16_0-0.1 SOIL - 17/4/2019 SE192028.023	S18_0-0.1 SOIL - 17/4/2019 SE192028.025
Naphthalene	mg/kg	0.1	<0.1	<0.1	<0.1	<0.1	<0.1
2-methylnaphthalene	mg/kg	0.1	<0.1	<0.1	<0.1	<0.1	<0.1
1-methylnaphthalene	mg/kg	0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Acenaphthylene	mg/kg	0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Acenaphthene	mg/kg	0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Fluorene	mg/kg	0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Phenanthrene	mg/kg	0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Anthracene	mg/kg	0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Fluoranthene	mg/kg	0.1	<0.1	<0.1	0.2	<0.1	<0.1
Pyrene	mg/kg	0.1	<0.1	<0.1	0.2	<0.1	<0.1
Benzo(a)anthracene	mg/kg	0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Chrysene	mg/kg	0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Benzo(b&j)fluoranthene	mg/kg	0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Benzo(k)fluoranthene	mg/kg	0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Benzo(a)pyrene	mg/kg	0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Indeno(1,2,3-cd)pyrene	mg/kg	0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Dibenzo(ah)anthracene	mg/kg	0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Benzo(ghi)perylene	mg/kg	0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Carcinogenic PAHs, BaP TEQ <LOR=0	TEQ (mg/kg)	0.2	<0.2	<0.2	<0.2	<0.2	<0.2
Carcinogenic PAHs, BaP TEQ <LOR=LOR	TEQ (mg/kg)	0.3	<0.3	<0.3	<0.3	<0.3	<0.3
Carcinogenic PAHs, BaP TEQ <LOR=LOR/2	TEQ (mg/kg)	0.2	<0.2	<0.2	<0.2	<0.2	<0.2
Total PAH (18)	mg/kg	0.8	<0.8	<0.8	<0.8	<0.8	<0.8
Total PAH (NEPM/WHO 16)	mg/kg	0.8	<0.8	<0.8	<0.8	<0.8	<0.8

PARAMETER	UOM	LOR	S19_0-0.1 SOIL - 17/4/2019 SE192028.026	S19_0.4-0.5 SOIL - 17/4/2019 SE192028.027	S20_0-0.1 SOIL - 17/4/2019 SE192028.028	S20_0.4-0.5 SOIL - 17/4/2019 SE192028.029	S23_0-0.1 SOIL - 17/4/2019 SE192028.032
Naphthalene	mg/kg	0.1	<0.1	<0.1	<0.1	<0.1	<0.1
2-methylnaphthalene	mg/kg	0.1	<0.1	<0.1	<0.1	<0.1	<0.1
1-methylnaphthalene	mg/kg	0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Acenaphthylene	mg/kg	0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Acenaphthene	mg/kg	0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Fluorene	mg/kg	0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Phenanthrene	mg/kg	0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Anthracene	mg/kg	0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Fluoranthene	mg/kg	0.1	<0.1	<0.1	0.3	<0.1	<0.1
Pyrene	mg/kg	0.1	<0.1	<0.1	0.3	<0.1	<0.1
Benzo(a)anthracene	mg/kg	0.1	<0.1	<0.1	0.1	<0.1	<0.1
Chrysene	mg/kg	0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Benzo(b&j)fluoranthene	mg/kg	0.1	<0.1	<0.1	0.1	<0.1	<0.1
Benzo(k)fluoranthene	mg/kg	0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Benzo(a)pyrene	mg/kg	0.1	<0.1	<0.1	0.1	<0.1	<0.1
Indeno(1,2,3-cd)pyrene	mg/kg	0.1	<0.1	<0.1	0.1	<0.1	<0.1
Dibenzo(ah)anthracene	mg/kg	0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Benzo(ghi)perylene	mg/kg	0.1	<0.1	<0.1	0.1	<0.1	<0.1
Carcinogenic PAHs, BaP TEQ <LOR=0	TEQ (mg/kg)	0.2	<0.2	<0.2	<0.2	<0.2	<0.2
Carcinogenic PAHs, BaP TEQ <LOR=LOR	TEQ (mg/kg)	0.3	<0.3	<0.3	<0.3	<0.3	<0.3
Carcinogenic PAHs, BaP TEQ <LOR=LOR/2	TEQ (mg/kg)	0.2	<0.2	<0.2	0.2	<0.2	<0.2
Total PAH (18)	mg/kg	0.8	<0.8	<0.8	1.2	<0.8	<0.8
Total PAH (NEPM/WHO 16)	mg/kg	0.8	<0.8	<0.8	1.2	<0.8	<0.8

PAH (Polynuclear Aromatic Hydrocarbons) in Soil [AN420] Tested: 26/4/2019 (continued)

PARAMETER	UOM	LOR	S24_0-0.1 SOIL - 17/4/2019 SE192028.033	S25_0-0.2 SOIL - 17/4/2019 SE192028.034	S26_0-0.2 SOIL - 17/4/2019 SE192028.035	QC01 SOIL - 17/4/2019 SE192028.036	QC03 SOIL - 17/4/2019 SE192028.037
Naphthalene	mg/kg	0.1	<0.1	<0.1	<0.1	<0.1	<0.1
2-methylnaphthalene	mg/kg	0.1	<0.1	<0.1	<0.1	<0.1	<0.1
1-methylnaphthalene	mg/kg	0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Acenaphthylene	mg/kg	0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Acenaphthene	mg/kg	0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Fluorene	mg/kg	0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Phenanthrene	mg/kg	0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Anthracene	mg/kg	0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Fluoranthene	mg/kg	0.1	<0.1	<0.1	<0.1	<0.1	0.2
Pyrene	mg/kg	0.1	<0.1	<0.1	<0.1	<0.1	0.2
Benzo(a)anthracene	mg/kg	0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Chrysene	mg/kg	0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Benzo(b&j)fluoranthene	mg/kg	0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Benzo(k)fluoranthene	mg/kg	0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Benzo(a)pyrene	mg/kg	0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Indeno(1,2,3-cd)pyrene	mg/kg	0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Dibenzo(ah)anthracene	mg/kg	0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Benzo(ghi)perylene	mg/kg	0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Carcinogenic PAHs, BaP TEQ <LOR=0	TEQ (mg/kg)	0.2	<0.2	<0.2	<0.2	<0.2	<0.2
Carcinogenic PAHs, BaP TEQ <LOR=LOR	TEQ (mg/kg)	0.3	<0.3	<0.3	<0.3	<0.3	<0.3
Carcinogenic PAHs, BaP TEQ <LOR=LOR/2	TEQ (mg/kg)	0.2	<0.2	<0.2	<0.2	<0.2	<0.2
Total PAH (18)	mg/kg	0.8	<0.8	<0.8	<0.8	<0.8	<0.8
Total PAH (NEPM/WHO 16)	mg/kg	0.8	<0.8	<0.8	<0.8	<0.8	<0.8

OC Pesticides in Soil [AN420] Tested: 26/4/2019

PARAMETER	UOM	LOR	S02_0-0.1 SOIL - 17/4/2019 SE192028.002	S02_0.4-0.5 SOIL - 17/4/2019 SE192028.003	S05_0-0.1 SOIL - 17/4/2019 SE192028.007	S05_0.4-0.5 SOIL - 17/4/2019 SE192028.008	S07_0-0.1 SOIL - 17/4/2019 SE192028.011
Hexachlorobenzene (HCB)	mg/kg	0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Alpha BHC	mg/kg	0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Lindane	mg/kg	0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Heptachlor	mg/kg	0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Aldrin	mg/kg	0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Beta BHC	mg/kg	0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Delta BHC	mg/kg	0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Heptachlor epoxide	mg/kg	0.1	<0.1	<0.1	<0.1	<0.1	<0.1
o,p'-DDE	mg/kg	0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Alpha Endosulfan	mg/kg	0.2	<0.2	<0.2	<0.2	<0.2	<0.2
Gamma Chlordane	mg/kg	0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Alpha Chlordane	mg/kg	0.1	<0.1	<0.1	<0.1	<0.1	<0.1
trans-Nonachlor	mg/kg	0.1	<0.1	<0.1	<0.1	<0.1	<0.1
p,p'-DDE	mg/kg	0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Dieldrin	mg/kg	0.2	<0.2	<0.2	<0.2	<0.2	<0.2
Endrin	mg/kg	0.2	<0.2	<0.2	<0.2	<0.2	<0.2
o,p'-DDD	mg/kg	0.1	<0.1	<0.1	<0.1	<0.1	<0.1
o,p'-DDT	mg/kg	0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Beta Endosulfan	mg/kg	0.2	<0.2	<0.2	<0.2	<0.2	<0.2
p,p'-DDD	mg/kg	0.1	<0.1	<0.1	<0.1	<0.1	<0.1
p,p'-DDT	mg/kg	0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Endosulfan sulphate	mg/kg	0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Endrin Aldehyde	mg/kg	0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Methoxychlor	mg/kg	0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Endrin Ketone	mg/kg	0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Isodrin	mg/kg	0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Mirex	mg/kg	0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Total CLP OC Pesticides	mg/kg	1	<1	<1	<1	<1	<1

OC Pesticides in Soil [AN420] Tested: 26/4/2019 (continued)

PARAMETER	UOM	LOR	S08_0-0.1 SOIL - 17/4/2019 SE192028.012	S08_0.3-0.4 SOIL - 17/4/2019 SE192028.013	S11_0-0.1 SOIL - 17/4/2019 SE192028.016	S11_0.4-0.5 SOIL - 17/4/2019 SE192028.017	S12_0-0.1 SOIL - 17/4/2019 SE192028.018
Hexachlorobenzene (HCB)	mg/kg	0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Alpha BHC	mg/kg	0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Lindane	mg/kg	0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Heptachlor	mg/kg	0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Aldrin	mg/kg	0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Beta BHC	mg/kg	0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Delta BHC	mg/kg	0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Heptachlor epoxide	mg/kg	0.1	<0.1	<0.1	<0.1	<0.1	<0.1
o,p'-DDE	mg/kg	0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Alpha Endosulfan	mg/kg	0.2	<0.2	<0.2	<0.2	<0.2	<0.2
Gamma Chlordane	mg/kg	0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Alpha Chlordane	mg/kg	0.1	<0.1	<0.1	<0.1	<0.1	<0.1
trans-Nonachlor	mg/kg	0.1	<0.1	<0.1	<0.1	<0.1	<0.1
p,p'-DDE	mg/kg	0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Dieldrin	mg/kg	0.2	<0.2	<0.2	<0.2	<0.2	<0.2
Endrin	mg/kg	0.2	<0.2	<0.2	<0.2	<0.2	<0.2
o,p'-DDD	mg/kg	0.1	<0.1	<0.1	<0.1	<0.1	<0.1
o,p'-DDT	mg/kg	0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Beta Endosulfan	mg/kg	0.2	<0.2	<0.2	<0.2	<0.2	<0.2
p,p'-DDD	mg/kg	0.1	<0.1	<0.1	<0.1	<0.1	<0.1
p,p'-DDT	mg/kg	0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Endosulfan sulphate	mg/kg	0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Endrin Aldehyde	mg/kg	0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Methoxychlor	mg/kg	0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Endrin Ketone	mg/kg	0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Isodrin	mg/kg	0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Mirex	mg/kg	0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Total CLP OC Pesticides	mg/kg	1	<1	<1	<1	<1	<1

OC Pesticides in Soil [AN420] Tested: 26/4/2019 (continued)

PARAMETER	UOM	LOR	S14_0-0.1 SOIL - 17/4/2019 SE192028.020	S14_0.4-0.5 SOIL - 17/4/2019 SE192028.021	S15_0-0.1 SOIL - 17/4/2019 SE192028.022	S16_0-0.1 SOIL - 17/4/2019 SE192028.023	S18_0-0.1 SOIL - 17/4/2019 SE192028.025
Hexachlorobenzene (HCB)	mg/kg	0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Alpha BHC	mg/kg	0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Lindane	mg/kg	0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Heptachlor	mg/kg	0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Aldrin	mg/kg	0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Beta BHC	mg/kg	0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Delta BHC	mg/kg	0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Heptachlor epoxide	mg/kg	0.1	<0.1	<0.1	<0.1	<0.1	<0.1
o,p'-DDE	mg/kg	0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Alpha Endosulfan	mg/kg	0.2	<0.2	<0.2	<0.2	<0.2	<0.2
Gamma Chlordane	mg/kg	0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Alpha Chlordane	mg/kg	0.1	<0.1	<0.1	<0.1	<0.1	<0.1
trans-Nonachlor	mg/kg	0.1	<0.1	<0.1	<0.1	<0.1	<0.1
p,p'-DDE	mg/kg	0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Dieldrin	mg/kg	0.2	<0.2	<0.2	<0.2	<0.2	<0.2
Endrin	mg/kg	0.2	<0.2	<0.2	<0.2	<0.2	<0.2
o,p'-DDD	mg/kg	0.1	<0.1	<0.1	<0.1	<0.1	<0.1
o,p'-DDT	mg/kg	0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Beta Endosulfan	mg/kg	0.2	<0.2	<0.2	<0.2	<0.2	<0.2
p,p'-DDD	mg/kg	0.1	<0.1	<0.1	<0.1	<0.1	<0.1
p,p'-DDT	mg/kg	0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Endosulfan sulphate	mg/kg	0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Endrin Aldehyde	mg/kg	0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Methoxychlor	mg/kg	0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Endrin Ketone	mg/kg	0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Isodrin	mg/kg	0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Mirex	mg/kg	0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Total CLP OC Pesticides	mg/kg	1	<1	<1	<1	<1	<1

OC Pesticides in Soil [AN420] Tested: 26/4/2019 (continued)

PARAMETER	UOM	LOR	S19_0-0.1 SOIL - 17/4/2019 SE192028.026	S19_0.4-0.5 SOIL - 17/4/2019 SE192028.027	S20_0-0.1 SOIL - 17/4/2019 SE192028.028	S20_0.4-0.5 SOIL - 17/4/2019 SE192028.029	S23_0-0.1 SOIL - 17/4/2019 SE192028.032
Hexachlorobenzene (HCB)	mg/kg	0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Alpha BHC	mg/kg	0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Lindane	mg/kg	0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Heptachlor	mg/kg	0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Aldrin	mg/kg	0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Beta BHC	mg/kg	0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Delta BHC	mg/kg	0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Heptachlor epoxide	mg/kg	0.1	<0.1	<0.1	<0.1	<0.1	<0.1
o,p'-DDE	mg/kg	0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Alpha Endosulfan	mg/kg	0.2	<0.2	<0.2	<0.2	<0.2	<0.2
Gamma Chlordane	mg/kg	0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Alpha Chlordane	mg/kg	0.1	<0.1	<0.1	<0.1	<0.1	<0.1
trans-Nonachlor	mg/kg	0.1	<0.1	<0.1	<0.1	<0.1	<0.1
p,p'-DDE	mg/kg	0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Dieldrin	mg/kg	0.2	<0.2	<0.2	<0.2	<0.2	<0.2
Endrin	mg/kg	0.2	<0.2	<0.2	<0.2	<0.2	<0.2
o,p'-DDD	mg/kg	0.1	<0.1	<0.1	<0.1	<0.1	<0.1
o,p'-DDT	mg/kg	0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Beta Endosulfan	mg/kg	0.2	<0.2	<0.2	<0.2	<0.2	<0.2
p,p'-DDD	mg/kg	0.1	<0.1	<0.1	<0.1	<0.1	<0.1
p,p'-DDT	mg/kg	0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Endosulfan sulphate	mg/kg	0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Endrin Aldehyde	mg/kg	0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Methoxychlor	mg/kg	0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Endrin Ketone	mg/kg	0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Isodrin	mg/kg	0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Mirex	mg/kg	0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Total CLP OC Pesticides	mg/kg	1	<1	<1	<1	<1	<1

OC Pesticides in Soil [AN420] Tested: 26/4/2019 (continued)

PARAMETER	UOM	LOR	S24_0-0.1 SOIL - 17/4/2019 SE192028.033	S25_0-0.2 SOIL - 17/4/2019 SE192028.034	S26_0-0.2 SOIL - 17/4/2019 SE192028.035	QC01 SOIL - 17/4/2019 SE192028.036	QC03 SOIL - 17/4/2019 SE192028.037
Hexachlorobenzene (HCB)	mg/kg	0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Alpha BHC	mg/kg	0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Lindane	mg/kg	0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Heptachlor	mg/kg	0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Aldrin	mg/kg	0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Beta BHC	mg/kg	0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Delta BHC	mg/kg	0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Heptachlor epoxide	mg/kg	0.1	<0.1	<0.1	<0.1	<0.1	<0.1
o,p'-DDE	mg/kg	0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Alpha Endosulfan	mg/kg	0.2	<0.2	<0.2	<0.2	<0.2	<0.2
Gamma Chlordane	mg/kg	0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Alpha Chlordane	mg/kg	0.1	<0.1	<0.1	<0.1	<0.1	<0.1
trans-Nonachlor	mg/kg	0.1	<0.1	<0.1	<0.1	<0.1	<0.1
p,p'-DDE	mg/kg	0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Dieldrin	mg/kg	0.2	<0.2	<0.2	<0.2	<0.2	<0.2
Endrin	mg/kg	0.2	<0.2	<0.2	<0.2	<0.2	<0.2
o,p'-DDD	mg/kg	0.1	<0.1	<0.1	<0.1	<0.1	<0.1
o,p'-DDT	mg/kg	0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Beta Endosulfan	mg/kg	0.2	<0.2	<0.2	<0.2	<0.2	<0.2
p,p'-DDD	mg/kg	0.1	<0.1	<0.1	<0.1	<0.1	<0.1
p,p'-DDT	mg/kg	0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Endosulfan sulphate	mg/kg	0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Endrin Aldehyde	mg/kg	0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Methoxychlor	mg/kg	0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Endrin Ketone	mg/kg	0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Isodrin	mg/kg	0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Mirex	mg/kg	0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Total CLP OC Pesticides	mg/kg	1	<1	<1	<1	<1	<1

OP Pesticides in Soil [AN420] Tested: 26/4/2019

PARAMETER	UOM	LOR	S02_0-0.1 SOIL - 17/4/2019 SE192028.002	S02_0.4-0.5 SOIL - 17/4/2019 SE192028.003	S05_0-0.1 SOIL - 17/4/2019 SE192028.007	S05_0.4-0.5 SOIL - 17/4/2019 SE192028.008	S07_0-0.1 SOIL - 17/4/2019 SE192028.011
Dichlorvos	mg/kg	0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Dimethoate	mg/kg	0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Diazinon (Dimpylate)	mg/kg	0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Fenitrothion	mg/kg	0.2	<0.2	<0.2	<0.2	<0.2	<0.2
Malathion	mg/kg	0.2	<0.2	<0.2	<0.2	<0.2	<0.2
Chlorpyrifos (Chlorpyrifos Ethyl)	mg/kg	0.2	<0.2	<0.2	<0.2	<0.2	<0.2
Parathion-ethyl (Parathion)	mg/kg	0.2	<0.2	<0.2	<0.2	<0.2	<0.2
Bromophos Ethyl	mg/kg	0.2	<0.2	<0.2	<0.2	<0.2	<0.2
Methidathion	mg/kg	0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Ethion	mg/kg	0.2	<0.2	<0.2	<0.2	<0.2	<0.2
Azinphos-methyl (Guthion)	mg/kg	0.2	<0.2	<0.2	<0.2	<0.2	<0.2
Total OP Pesticides*	mg/kg	1.7	<1.7	<1.7	<1.7	<1.7	<1.7

PARAMETER	UOM	LOR	S08_0-0.1 SOIL - 17/4/2019 SE192028.012	S08_0.3-0.4 SOIL - 17/4/2019 SE192028.013	S11_0-0.1 SOIL - 17/4/2019 SE192028.016	S11_0.4-0.5 SOIL - 17/4/2019 SE192028.017	S12_0-0.1 SOIL - 17/4/2019 SE192028.018
Dichlorvos	mg/kg	0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Dimethoate	mg/kg	0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Diazinon (Dimpylate)	mg/kg	0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Fenitrothion	mg/kg	0.2	<0.2	<0.2	<0.2	<0.2	<0.2
Malathion	mg/kg	0.2	<0.2	<0.2	<0.2	<0.2	<0.2
Chlorpyrifos (Chlorpyrifos Ethyl)	mg/kg	0.2	<0.2	<0.2	<0.2	<0.2	<0.2
Parathion-ethyl (Parathion)	mg/kg	0.2	<0.2	<0.2	<0.2	<0.2	<0.2
Bromophos Ethyl	mg/kg	0.2	<0.2	<0.2	<0.2	<0.2	<0.2
Methidathion	mg/kg	0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Ethion	mg/kg	0.2	<0.2	<0.2	<0.2	<0.2	<0.2
Azinphos-methyl (Guthion)	mg/kg	0.2	<0.2	<0.2	<0.2	<0.2	<0.2
Total OP Pesticides*	mg/kg	1.7	<1.7	<1.7	<1.7	<1.7	<1.7

PARAMETER	UOM	LOR	S14_0-0.1 SOIL - 17/4/2019 SE192028.020	S14_0.4-0.5 SOIL - 17/4/2019 SE192028.021	S15_0-0.1 SOIL - 17/4/2019 SE192028.022	S16_0-0.1 SOIL - 17/4/2019 SE192028.023	S18_0-0.1 SOIL - 17/4/2019 SE192028.025
Dichlorvos	mg/kg	0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Dimethoate	mg/kg	0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Diazinon (Dimpylate)	mg/kg	0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Fenitrothion	mg/kg	0.2	<0.2	<0.2	<0.2	<0.2	<0.2
Malathion	mg/kg	0.2	<0.2	<0.2	<0.2	<0.2	<0.2
Chlorpyrifos (Chlorpyrifos Ethyl)	mg/kg	0.2	<0.2	<0.2	<0.2	<0.2	<0.2
Parathion-ethyl (Parathion)	mg/kg	0.2	<0.2	<0.2	<0.2	<0.2	<0.2
Bromophos Ethyl	mg/kg	0.2	<0.2	<0.2	<0.2	<0.2	<0.2
Methidathion	mg/kg	0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Ethion	mg/kg	0.2	<0.2	<0.2	<0.2	<0.2	<0.2
Azinphos-methyl (Guthion)	mg/kg	0.2	<0.2	<0.2	<0.2	<0.2	<0.2
Total OP Pesticides*	mg/kg	1.7	<1.7	<1.7	<1.7	<1.7	<1.7

OP Pesticides in Soil [AN420] Tested: 26/4/2019 (continued)

PARAMETER	UOM	LOR	S19_0-0.1 SOIL - 17/4/2019 SE192028.026	S19_0.4-0.5 SOIL - 17/4/2019 SE192028.027	S20_0-0.1 SOIL - 17/4/2019 SE192028.028	S20_0.4-0.5 SOIL - 17/4/2019 SE192028.029	S23_0-0.1 SOIL - 17/4/2019 SE192028.032
Dichlorvos	mg/kg	0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Dimethoate	mg/kg	0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Diazinon (Dimpylate)	mg/kg	0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Fenitrothion	mg/kg	0.2	<0.2	<0.2	<0.2	<0.2	<0.2
Malathion	mg/kg	0.2	<0.2	<0.2	<0.2	<0.2	<0.2
Chlorpyrifos (Chlorpyrifos Ethyl)	mg/kg	0.2	<0.2	<0.2	<0.2	<0.2	<0.2
Parathion-ethyl (Parathion)	mg/kg	0.2	<0.2	<0.2	<0.2	<0.2	<0.2
Bromophos Ethyl	mg/kg	0.2	<0.2	<0.2	<0.2	<0.2	<0.2
Methidathion	mg/kg	0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Ethion	mg/kg	0.2	<0.2	<0.2	<0.2	<0.2	<0.2
Azinphos-methyl (Guthion)	mg/kg	0.2	<0.2	<0.2	<0.2	<0.2	<0.2
Total OP Pesticides*	mg/kg	1.7	<1.7	<1.7	<1.7	<1.7	<1.7

PARAMETER	UOM	LOR	S24_0-0.1 SOIL - 17/4/2019 SE192028.033	S25_0-0.2 SOIL - 17/4/2019 SE192028.034	S26_0-0.2 SOIL - 17/4/2019 SE192028.035	QC01 SOIL - 17/4/2019 SE192028.036	QC03 SOIL - 17/4/2019 SE192028.037
Dichlorvos	mg/kg	0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Dimethoate	mg/kg	0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Diazinon (Dimpylate)	mg/kg	0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Fenitrothion	mg/kg	0.2	<0.2	<0.2	<0.2	<0.2	<0.2
Malathion	mg/kg	0.2	<0.2	<0.2	<0.2	<0.2	<0.2
Chlorpyrifos (Chlorpyrifos Ethyl)	mg/kg	0.2	<0.2	<0.2	<0.2	<0.2	<0.2
Parathion-ethyl (Parathion)	mg/kg	0.2	<0.2	<0.2	<0.2	<0.2	<0.2
Bromophos Ethyl	mg/kg	0.2	<0.2	<0.2	<0.2	<0.2	<0.2
Methidathion	mg/kg	0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Ethion	mg/kg	0.2	<0.2	<0.2	<0.2	<0.2	<0.2
Azinphos-methyl (Guthion)	mg/kg	0.2	<0.2	<0.2	<0.2	<0.2	<0.2
Total OP Pesticides*	mg/kg	1.7	<1.7	<1.7	<1.7	<1.7	<1.7

PCBs in Soil [AN420] Tested: 26/4/2019

			S02_0-0.1	S02_0.4-0.5	S05_0-0.1	S05_0.4-0.5	S07_0-0.1
			SOIL	SOIL	SOIL	SOIL	SOIL
			-	-	-	-	-
			17/4/2019	17/4/2019	17/4/2019	17/4/2019	17/4/2019
PARAMETER	**UOM**	**LOR**	**SE192028.002**	**SE192028.003**	**SE192028.007**	**SE192028.008**	**SE192028.011**
Arochlor 1016	mg/kg	0.2	<0.2	<0.2	<0.2	<0.2	<0.2
Arochlor 1221	mg/kg	0.2	<0.2	<0.2	<0.2	<0.2	<0.2
Arochlor 1232	mg/kg	0.2	<0.2	<0.2	<0.2	<0.2	<0.2
Arochlor 1242	mg/kg	0.2	<0.2	<0.2	<0.2	<0.2	<0.2
Arochlor 1248	mg/kg	0.2	<0.2	<0.2	<0.2	<0.2	<0.2
Arochlor 1254	mg/kg	0.2	<0.2	<0.2	**1.5**	<0.2	<0.2
Arochlor 1260	mg/kg	0.2	<0.2	<0.2	<0.2	<0.2	<0.2
Arochlor 1262	mg/kg	0.2	<0.2	<0.2	<0.2	<0.2	<0.2
Arochlor 1268	mg/kg	0.2	<0.2	<0.2	<0.2	<0.2	<0.2
Total PCBs (Arochlors)	mg/kg	1	<1	<1	**2**	<1	<1

			S08_0-0.1	S08_0.3-0.4	S11_0-0.1	S11_0.4-0.5	S12_0-0.1
			SOIL	SOIL	SOIL	SOIL	SOIL
			-	-	-	-	-
			17/4/2019	17/4/2019	17/4/2019	17/4/2019	17/4/2019
PARAMETER	**UOM**	**LOR**	**SE192028.012**	**SE192028.013**	**SE192028.016**	**SE192028.017**	**SE192028.018**
Arochlor 1016	mg/kg	0.2	<0.2	<0.2	<0.2	<0.2	<0.2
Arochlor 1221	mg/kg	0.2	<0.2	<0.2	<0.2	<0.2	<0.2
Arochlor 1232	mg/kg	0.2	<0.2	<0.2	<0.2	<0.2	<0.2
Arochlor 1242	mg/kg	0.2	<0.2	<0.2	<0.2	<0.2	<0.2
Arochlor 1248	mg/kg	0.2	<0.2	<0.2	<0.2	<0.2	<0.2
Arochlor 1254	mg/kg	0.2	<0.2	<0.2	<0.2	<0.2	<0.2
Arochlor 1260	mg/kg	0.2	<0.2	<0.2	<0.2	<0.2	<0.2
Arochlor 1262	mg/kg	0.2	<0.2	<0.2	<0.2	<0.2	<0.2
Arochlor 1268	mg/kg	0.2	<0.2	<0.2	<0.2	<0.2	<0.2
Total PCBs (Arochlors)	mg/kg	1	<1	<1	<1	<1	<1

			S14_0-0.1	S14_0.4-0.5	S15_0-0.1	S16_0-0.1	S18_0-0.1
			SOIL	SOIL	SOIL	SOIL	SOIL
			-	-	-	-	-
			17/4/2019	17/4/2019	17/4/2019	17/4/2019	17/4/2019
PARAMETER	**UOM**	**LOR**	**SE192028.020**	**SE192028.021**	**SE192028.022**	**SE192028.023**	**SE192028.025**
Arochlor 1016	mg/kg	0.2	<0.2	<0.2	<0.2	<0.2	<0.2
Arochlor 1221	mg/kg	0.2	<0.2	<0.2	<0.2	<0.2	<0.2
Arochlor 1232	mg/kg	0.2	<0.2	<0.2	<0.2	<0.2	<0.2
Arochlor 1242	mg/kg	0.2	<0.2	<0.2	<0.2	<0.2	<0.2
Arochlor 1248	mg/kg	0.2	<0.2	<0.2	<0.2	<0.2	<0.2
Arochlor 1254	mg/kg	0.2	<0.2	<0.2	<0.2	<0.2	<0.2
Arochlor 1260	mg/kg	0.2	<0.2	<0.2	<0.2	<0.2	<0.2
Arochlor 1262	mg/kg	0.2	<0.2	<0.2	<0.2	<0.2	<0.2
Arochlor 1268	mg/kg	0.2	<0.2	<0.2	<0.2	<0.2	<0.2
Total PCBs (Arochlors)	mg/kg	1	<1	<1	<1	<1	<1

PCBs in Soil [AN420] Tested: 26/4/2019 (continued)

PARAMETER	UOM	LOR	S19_0-0.1 SOIL - 17/4/2019 SE192028.026	S19_0.4-0.5 SOIL - 17/4/2019 SE192028.027	S20_0-0.1 SOIL - 17/4/2019 SE192028.028	S20_0.4-0.5 SOIL - 17/4/2019 SE192028.029	S23_0-0.1 SOIL - 17/4/2019 SE192028.032
Arochlor 1016	mg/kg	0.2	<0.2	<0.2	<0.2	<0.2	<0.2
Arochlor 1221	mg/kg	0.2	<0.2	<0.2	<0.2	<0.2	<0.2
Arochlor 1232	mg/kg	0.2	<0.2	<0.2	<0.2	<0.2	<0.2
Arochlor 1242	mg/kg	0.2	<0.2	<0.2	<0.2	<0.2	<0.2
Arochlor 1248	mg/kg	0.2	<0.2	<0.2	<0.2	<0.2	<0.2
Arochlor 1254	mg/kg	0.2	<0.2	<0.2	<0.2	<0.2	<0.2
Arochlor 1260	mg/kg	0.2	<0.2	<0.2	<0.2	<0.2	<0.2
Arochlor 1262	mg/kg	0.2	<0.2	<0.2	<0.2	<0.2	<0.2
Arochlor 1268	mg/kg	0.2	<0.2	<0.2	<0.2	<0.2	<0.2
Total PCBs (Arochlors)	mg/kg	1	<1	<1	<1	<1	<1

PARAMETER	UOM	LOR	S24_0-0.1 SOIL - 17/4/2019 SE192028.033	S25_0-0.2 SOIL - 17/4/2019 SE192028.034	S26_0-0.2 SOIL - 17/4/2019 SE192028.035	QC01 SOIL - 17/4/2019 SE192028.036	QC03 SOIL - 17/4/2019 SE192028.037
Arochlor 1016	mg/kg	0.2	<0.2	<0.2	<0.2	<0.2	<0.2
Arochlor 1221	mg/kg	0.2	<0.2	<0.2	<0.2	<0.2	<0.2
Arochlor 1232	mg/kg	0.2	<0.2	<0.2	<0.2	<0.2	<0.2
Arochlor 1242	mg/kg	0.2	<0.2	<0.2	<0.2	<0.2	<0.2
Arochlor 1248	mg/kg	0.2	<0.2	<0.2	<0.2	<0.2	<0.2
Arochlor 1254	mg/kg	0.2	<0.2	<0.2	<0.2	**1.0**	<0.2
Arochlor 1260	mg/kg	0.2	<0.2	<0.2	<0.2	<0.2	<0.2
Arochlor 1262	mg/kg	0.2	<0.2	<0.2	<0.2	<0.2	<0.2
Arochlor 1268	mg/kg	0.2	<0.2	<0.2	<0.2	<0.2	<0.2
Total PCBs (Arochlors)	mg/kg	1	<1	<1	<1	<1	<1

Total Recoverable Elements in Soil/Waste Solids/Materials by ICPOES [AN040/AN320] Tested: 26/4/2019

PARAMETER	UOM	LOR	S01_0-0.1 SOIL - 17/4/2019 SE192028.001	S02_0-0.1 SOIL - 17/4/2019 SE192028.002	S02_0.4-0.5 SOIL - 17/4/2019 SE192028.003	S03_0-0.1 SOIL - 17/4/2019 SE192028.004	S04_0-0.1 SOIL - 17/4/2019 SE192028.005
Arsenic, As	mg/kg	1	<1	3	10	11	4
Cadmium, Cd	mg/kg	0.3	<0.3	<0.3	<0.3	0.3	<0.3
Chromium, Cr	mg/kg	0.3	19	17	40	4.4	42
Copper, Cu	mg/kg	0.5	8.6	7.3	120	3.2	76
Lead, Pb	mg/kg	1	12	6	25	11	20
Nickel, Ni	mg/kg	0.5	9.2	8.1	42	1.1	62
Zinc, Zn	mg/kg	2	40	28	52	300	66

PARAMETER	UOM	LOR	S04_-0.4-0.5 SOIL - 17/4/2019 SE192028.006	S05_0-0.1 SOIL - 17/4/2019 SE192028.007	S05_0.4-0.5 SOIL - 17/4/2019 SE192028.008	S06_0-0.1 SOIL - 17/4/2019 SE192028.009	S06_0.4-0.5 SOIL - 17/4/2019 SE192028.010
Arsenic, As	mg/kg	1	5	3	13	3	4
Cadmium, Cd	mg/kg	0.3	<0.3	1.9	<0.3	<0.3	<0.3
Chromium, Cr	mg/kg	0.3	54	45	63	16	46
Copper, Cu	mg/kg	0.5	40	64	46	6.9	79
Lead, Pb	mg/kg	1	10	110	11	10	18
Nickel, Ni	mg/kg	0.5	53	47	70	7.8	67
Zinc, Zn	mg/kg	2	40	1300	81	33	54

PARAMETER	UOM	LOR	S07_0-0.1 SOIL - 17/4/2019 SE192028.011	S08_0-0.1 SOIL - 17/4/2019 SE192028.012	S08_0.3-0.4 SOIL - 17/4/2019 SE192028.013	S09_0-0.1 SOIL - 17/4/2019 SE192028.014	S10_0-0.1 SOIL - 17/4/2019 SE192028.015
Arsenic, As	mg/kg	1	3	2	9	2	3
Cadmium, Cd	mg/kg	0.3	<0.3	<0.3	<0.3	<0.3	0.9
Chromium, Cr	mg/kg	0.3	12	21	8.6	21	42
Copper, Cu	mg/kg	0.5	5.9	8.4	3.2	8.5	47
Lead, Pb	mg/kg	1	8	4	10	5	43
Nickel, Ni	mg/kg	0.5	6.3	9.5	4.3	9.5	53
Zinc, Zn	mg/kg	2	25	33	21	36	320

PARAMETER	UOM	LOR	S11_0-0.1 SOIL - 17/4/2019 SE192028.016	S11_0.4-0.5 SOIL - 17/4/2019 SE192028.017	S12_0-0.1 SOIL - 17/4/2019 SE192028.018	S13_0-0.1 SOIL - 17/4/2019 SE192028.019	S14_0-0.1 SOIL - 17/4/2019 SE192028.020
Arsenic, As	mg/kg	1	3	4	3	13	4
Cadmium, Cd	mg/kg	0.3	<0.3	<0.3	<0.3	<0.3	<0.3
Chromium, Cr	mg/kg	0.3	20	51	21	53	75
Copper, Cu	mg/kg	0.5	11	28	8.7	32	45
Lead, Pb	mg/kg	1	19	7	12	16	32
Nickel, Ni	mg/kg	0.5	9.4	66	12	51	72
Zinc, Zn	mg/kg	2	40	43	34	63	95

Total Recoverable Elements in Soil/Waste Solids/Materials by ICPOES [AN040/AN320] Tested: 26/4/2019 (continued)

PARAMETER	UOM	LOR	S14_0.4-0.5 SOIL - 17/4/2019 SE192028.021	S15_0-0.1 SOIL - 17/4/2019 SE192028.022	S16_0-0.1 SOIL - 17/4/2019 SE192028.023	S17_0-0.1 SOIL - 17/4/2019 SE192028.024	S18_0-0.1 SOIL - 17/4/2019 SE192028.025
Arsenic, As	mg/kg	1	3	4	5	4	2
Cadmium, Cd	mg/kg	0.3	<0.3	<0.3	<0.3	<0.3	<0.3
Chromium, Cr	mg/kg	0.3	84	70	11	53	74
Copper, Cu	mg/kg	0.5	40	38	8.0	35	43
Lead, Pb	mg/kg	1	7	140	30	49	34
Nickel, Ni	mg/kg	0.5	89	67	9.3	82	89
Zinc, Zn	mg/kg	2	66	66	28	71	80

PARAMETER	UOM	LOR	S19_0-0.1 SOIL - 17/4/2019 SE192028.026	S19_0.4-0.5 SOIL - 17/4/2019 SE192028.027	S20_0-0.1 SOIL - 17/4/2019 SE192028.028	S20_0.4-0.5 SOIL - 17/4/2019 SE192028.029	S21_0-0.1 SOIL - 17/4/2019 SE192028.030
Arsenic, As	mg/kg	1	4	2	5	2	3
Cadmium, Cd	mg/kg	0.3	<0.3	<0.3	<0.3	<0.3	<0.3
Chromium, Cr	mg/kg	0.3	69	100	18	59	64
Copper, Cu	mg/kg	0.5	49	45	12	41	33
Lead, Pb	mg/kg	1	160	9	47	8	45
Nickel, Ni	mg/kg	0.5	69	110	19	110	64
Zinc, Zn	mg/kg	2	110	79	38	44	68

PARAMETER	UOM	LOR	S22_0-0.1 SOIL - 17/4/2019 SE192028.031	S23_0-0.1 SOIL - 17/4/2019 SE192028.032	S24_0-0.1 SOIL - 17/4/2019 SE192028.033	S25_0-0.2 SOIL - 17/4/2019 SE192028.034	S26_0-0.2 SOIL - 17/4/2019 SE192028.035
Arsenic, As	mg/kg	1	4	4	2	13	3
Cadmium, Cd	mg/kg	0.3	<0.3	<0.3	<0.3	<0.3	<0.3
Chromium, Cr	mg/kg	0.3	94	17	30	17	24
Copper, Cu	mg/kg	0.5	44	12	11	11	18
Lead, Pb	mg/kg	1	46	9	6	8	11
Nickel, Ni	mg/kg	0.5	96	44	18	12	61
Zinc, Zn	mg/kg	2	83	39	44	35	140

PARAMETER	UOM	LOR	QC01 SOIL - 17/4/2019 SE192028.036	QC03 SOIL - 17/4/2019 SE192028.037
Arsenic, As	mg/kg	1	6	5
Cadmium, Cd	mg/kg	0.3	2.7	<0.3
Chromium, Cr	mg/kg	0.3	59	72
Copper, Cu	mg/kg	0.5	74	39
Lead, Pb	mg/kg	1	140	170
Nickel, Ni	mg/kg	0.5	65	68
Zinc, Zn	mg/kg	2	1800	70

Mercury in Soil [AN312] Tested: 26/4/2019

PARAMETER	UOM	LOR	S01_0-0.1 SOIL - 17/4/2019 SE192028.001	S02_0-0.1 SOIL - 17/4/2019 SE192028.002	S02_0.4-0.5 SOIL - 17/4/2019 SE192028.003	S03_0-0.1 SOIL - 17/4/2019 SE192028.004	S04_0-0.1 SOIL - 17/4/2019 SE192028.005
Mercury	mg/kg	0.05	<0.05	<0.05	0.35	<0.05	0.11

PARAMETER	UOM	LOR	S04_-0.4-0.5 SOIL - 17/4/2019 SE192028.006	S05_0-0.1 SOIL - 17/4/2019 SE192028.007	S05_0.4-0.5 SOIL - 17/4/2019 SE192028.008	S06_0-0.1 SOIL - 17/4/2019 SE192028.009	S06_0.4-0.5 SOIL - 17/4/2019 SE192028.010
Mercury	mg/kg	0.05	<0.05	0.11	<0.05	<0.05	0.09

PARAMETER	UOM	LOR	S07_0-0.1 SOIL - 17/4/2019 SE192028.011	S08_0-0.1 SOIL - 17/4/2019 SE192028.012	S08_0.3-0.4 SOIL - 17/4/2019 SE192028.013	S09_0-0.1 SOIL - 17/4/2019 SE192028.014	S10_0-0.1 SOIL - 17/4/2019 SE192028.015
Mercury	mg/kg	0.05	<0.05	<0.05	<0.05	<0.05	0.08

PARAMETER	UOM	LOR	S11_0-0.1 SOIL - 17/4/2019 SE192028.016	S11_0.4-0.5 SOIL - 17/4/2019 SE192028.017	S12_0-0.1 SOIL - 17/4/2019 SE192028.018	S13_0-0.1 SOIL - 17/4/2019 SE192028.019	S14_0-0.1 SOIL - 17/4/2019 SE192028.020
Mercury	mg/kg	0.05	<0.05	<0.05	<0.05	0.22	<0.05

PARAMETER	UOM	LOR	S14_0.4-0.5 SOIL - 17/4/2019 SE192028.021	S15_0-0.1 SOIL - 17/4/2019 SE192028.022	S16_0-0.1 SOIL - 17/4/2019 SE192028.023	S17_0-0.1 SOIL - 17/4/2019 SE192028.024	S18_0-0.1 SOIL - 17/4/2019 SE192028.025
Mercury	mg/kg	0.05	<0.05	<0.05	<0.05	<0.05	<0.05

PARAMETER	UOM	LOR	S19_0-0.1 SOIL - 17/4/2019 SE192028.026	S19_0.4-0.5 SOIL - 17/4/2019 SE192028.027	S20_0-0.1 SOIL - 17/4/2019 SE192028.028	S20_0.4-0.5 SOIL - 17/4/2019 SE192028.029	S21_0-0.1 SOIL - 17/4/2019 SE192028.030
Mercury	mg/kg	0.05	0.06	<0.05	<0.05	<0.05	<0.05

PARAMETER	UOM	LOR	S22_0-0.1 SOIL - 17/4/2019 SE192028.031	S23_0-0.1 SOIL - 17/4/2019 SE192028.032	S24_0-0.1 SOIL - 17/4/2019 SE192028.033	S25_0-0.2 SOIL - 17/4/2019 SE192028.034	S26_0-0.2 SOIL - 17/4/2019 SE192028.035
Mercury	mg/kg	0.05	<0.05	<0.05	<0.05	<0.05	<0.05

Mercury in Soil [AN312] Tested: 26/4/2019 (continued)

PARAMETER	UOM	LOR	QC01 SOIL - 17/4/2019 SE192028.036	QC03 SOIL - 17/4/2019 SE192028.037
Mercury	mg/kg	0.05	0.08	<0.05

Moisture Content [AN002] Tested: 26/4/2019

PARAMETER	UOM	LOR	S01_0-0.1 SOIL - 17/4/2019 SE192028.001	S02_0-0.1 SOIL - 17/4/2019 SE192028.002	S02_0.4-0.5 SOIL - 17/4/2019 SE192028.003	S03_0-0.1 SOIL - 17/4/2019 SE192028.004	S04_0-0.1 SOIL - 17/4/2019 SE192028.005
% Moisture	%w/w	0.5	8.5	4.3	25	2.8	5.4

PARAMETER	UOM	LOR	S04_-0.4-0.5 SOIL - 17/4/2019 SE192028.006	S05_0-0.1 SOIL - 17/4/2019 SE192028.007	S05_0.4-0.5 SOIL - 17/4/2019 SE192028.008	S06_0-0.1 SOIL - 17/4/2019 SE192028.009	S06_0.4-0.5 SOIL - 17/4/2019 SE192028.010
% Moisture	%w/w	0.5	12	28	28	4.3	22

PARAMETER	UOM	LOR	S07_0-0.1 SOIL - 17/4/2019 SE192028.011	S08_0-0.1 SOIL - 17/4/2019 SE192028.012	S08_0.3-0.4 SOIL - 17/4/2019 SE192028.013	S09_0-0.1 SOIL - 17/4/2019 SE192028.014	S10_0-0.1 SOIL - 17/4/2019 SE192028.015
% Moisture	%w/w	0.5	2.2	3.4	3.3	4.5	19

PARAMETER	UOM	LOR	S11_0-0.1 SOIL - 17/4/2019 SE192028.016	S11_0.4-0.5 SOIL - 17/4/2019 SE192028.017	S12_0-0.1 SOIL - 17/4/2019 SE192028.018	S13_0-0.1 SOIL - 17/4/2019 SE192028.019	S14_0-0.1 SOIL - 17/4/2019 SE192028.020
% Moisture	%w/w	0.5	19	24	4.2	12	15

PARAMETER	UOM	LOR	S14_0.4-0.5 SOIL - 17/4/2019 SE192028.021	S15_0-0.1 SOIL - 17/4/2019 SE192028.022	S16_0-0.1 SOIL - 17/4/2019 SE192028.023	S17_0-0.1 SOIL - 17/4/2019 SE192028.024	S18_0-0.1 SOIL - 17/4/2019 SE192028.025
% Moisture	%w/w	0.5	22	11	4.0	12	11

PARAMETER	UOM	LOR	S19_0-0.1 SOIL - 17/4/2019 SE192028.026	S19_0.4-0.5 SOIL - 17/4/2019 SE192028.027	S20_0-0.1 SOIL - 17/4/2019 SE192028.028	S20_0.4-0.5 SOIL - 17/4/2019 SE192028.029	S21_0-0.1 SOIL - 17/4/2019 SE192028.030
% Moisture	%w/w	0.5	9.8	24	5.8	3.8	13

PARAMETER	UOM	LOR	S22_0-0.1 SOIL - 17/4/2019 SE192028.031	S23_0-0.1 SOIL - 17/4/2019 SE192028.032	S24_0-0.1 SOIL - 17/4/2019 SE192028.033	S25_0-0.2 SOIL - 17/4/2019 SE192028.034	S26_0-0.2 SOIL - 17/4/2019 SE192028.035
% Moisture	%w/w	0.5	15	1.7	4.9	4.6	4.1

Moisture Content [AN002] Tested: 26/4/2019 (continued)

			QC01 SOIL - 17/4/2019	QC03 SOIL - 17/4/2019	TB01 SOIL - 17/4/2019
PARAMETER	**UOM**	**LOR**	**SE192028.036**	**SE192028.037**	**SE192028.039**
% Moisture	%w/w	0.5	27	12	6.4

Fibre Identification in soil [AN602] Tested: 26/4/2019

PARAMETER	UOM	LOR	S01_0-0.1 SOIL - 17/4/2019 SE192028.001	S02_0-0.1 SOIL - 17/4/2019 SE192028.002	S05_0-0.1 SOIL - 17/4/2019 SE192028.007	S07_0-0.1 SOIL - 17/4/2019 SE192028.011	S08_0-0.1 SOIL - 17/4/2019 SE192028.012
Asbestos Detected	No unit	-	No	No	No	No	No
Estimated Fibres*	%w/w	0.01	<0.01	<0.01	<0.01	<0.01	<0.01

PARAMETER	UOM	LOR	S10_0-0.1 SOIL - 17/4/2019 SE192028.015	S11_0-0.1 SOIL - 17/4/2019 SE192028.016	S12_0-0.1 SOIL - 17/4/2019 SE192028.018	S14_0-0.1 SOIL - 17/4/2019 SE192028.020	S16_0-0.1 SOIL - 17/4/2019 SE192028.023
Asbestos Detected	No unit	-	No	No	No	No	No
Estimated Fibres*	%w/w	0.01	<0.01	<0.01	<0.01	<0.01	<0.01

PARAMETER	UOM	LOR	S18_0-0.1 SOIL - 17/4/2019 SE192028.025	S19_0-0.1 SOIL - 17/4/2019 SE192028.026	S20_0-0.1 SOIL - 17/4/2019 SE192028.028	S23_0-0.1 SOIL - 17/4/2019 SE192028.032	S24_0-0.1 SOIL - 17/4/2019 SE192028.033
Asbestos Detected	No unit	-	No	No	No	No	No
Estimated Fibres*	%w/w	0.01	<0.01	<0.01	<0.01	<0.01	<0.01

PARAMETER	UOM	LOR	S25_0-0.2 SOIL - 17/4/2019 SE192028.034	S26_0-0.2 SOIL - 17/4/2019 SE192028.035
Asbestos Detected	No unit	-	No	No
Estimated Fibres*	%w/w	0.01	<0.01	.<0.01

Gravimetric Determination of Asbestos in Soil [AN605] Tested: 26/4/2019

PARAMETER	UOM	LOR	S01_0-0.1 SOIL - 17/4/2019 SE192028.001	S02_0-0.1 SOIL - 17/4/2019 SE192028.002	S05_0-0.1 SOIL - 17/4/2019 SE192028.007	S07_0-0.1 SOIL - 17/4/2019 SE192028.011	S08_0-0.1 SOIL - 17/4/2019 SE192028.012
Total Sample Weight*	g	1	587	697	437	845	740
ACM in >7mm Sample*	g	0.01	<0.01	<0.01	<0.01	<0.01	<0.01
AF/FA in >2mm to <7mm Sample*	g	0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001
AF/FA in <2mm Sample*	g	0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001
Asbestos in soil (>7mm ACM)*	%w/w	0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Asbestos in soil (>2mm to <7mm AF/FA)*	%w/w	0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Asbestos in soil (<2mm AF/FA)*	%w/w	0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Asbestos in soil (<7mm AF/FA)*	%w/w	0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Fibre Type*	No unit	-	-	-	-	-	-

PARAMETER	UOM	LOR	S10_0-0.1 SOIL - 17/4/2019 SE192028.015	S11_0-0.1 SOIL - 17/4/2019 SE192028.016	S12_0-0.1 SOIL - 17/4/2019 SE192028.018	S14_0-0.1 SOIL - 17/4/2019 SE192028.020	S16_0-0.1 SOIL - 17/4/2019 SE192028.023
Total Sample Weight*	g	1	389	477	676	577	967
ACM in >7mm Sample*	g	0.01	<0.01	<0.01	<0.01	<0.01	<0.01
AF/FA in >2mm to <7mm Sample*	g	0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001
AF/FA in <2mm Sample*	g	0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001
Asbestos in soil (>7mm ACM)*	%w/w	0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Asbestos in soil (>2mm to <7mm AF/FA)*	%w/w	0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Asbestos in soil (<2mm AF/FA)*	%w/w	0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Asbestos in soil (<7mm AF/FA)*	%w/w	0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Fibre Type*	No unit	-	-	-	-	-	-

PARAMETER	UOM	LOR	S18_0-0.1 SOIL - 17/4/2019 SE192028.025	S19_0-0.1 SOIL - 17/4/2019 SE192028.026	S20_0-0.1 SOIL - 17/4/2019 SE192028.028	S23_0-0.1 SOIL - 17/4/2019 SE192028.032	S24_0-0.1 SOIL - 17/4/2019 SE192028.033
Total Sample Weight*	g	1	528	637	634	967	1032
ACM in >7mm Sample*	g	0.01	<0.01	<0.01	<0.01	<0.01	<0.01
AF/FA in >2mm to <7mm Sample*	g	0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001
AF/FA in <2mm Sample*	g	0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001
Asbestos in soil (>7mm ACM)*	%w/w	0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Asbestos in soil (>2mm to <7mm AF/FA)*	%w/w	0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Asbestos in soil (<2mm AF/FA)*	%w/w	0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Asbestos in soil (<7mm AF/FA)*	%w/w	0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Fibre Type*	No unit	-	-	-	-	-	-

PARAMETER	UOM	LOR	S25_0-0.2 SOIL - 17/4/2019 SE192028.034	S26_0-0.2 SOIL - 17/4/2019 SE192028.035
Total Sample Weight*	g	1	777	1000
ACM in >7mm Sample*	g	0.01	<0.01	<0.01
AF/FA in >2mm to <7mm Sample*	g	0.0001	<0.0001	<0.0001
AF/FA in <2mm Sample*	g	0.0001	<0.0001	<0.0001
Asbestos in soil (>7mm ACM)*	%w/w	0.01	<0.01	<0.01
Asbestos in soil (>2mm to <7mm AF/FA)*	%w/w	0.001	<0.001	<0.001
Asbestos in soil (<2mm AF/FA)*	%w/w	0.001	<0.001	<0.001
Asbestos in soil (<7mm AF/FA)*	%w/w	0.001	<0.001	<0.001
Fibre Type*	No unit	-	-	-

VOCs in Water [AN433] Tested: 26/4/2019

			FB01 WATER - 17/4/2019	Rinsate_170419 WATER - 17/4/2019
PARAMETER	**UOM**	**LOR**	**SE192028.038**	**SE192028.041**
Benzene	µg/L	0.5	<0.5	<0.5
Toluene	µg/L	0.5	<0.5	<0.5
Ethylbenzene	µg/L	0.5	<0.5	<0.5
m/p-xylene	µg/L	1	<1	<1
o-xylene	µg/L	0.5	<0.5	<0.5
Total Xylenes	µg/L	1.5	<1.5	<1.5
Total BTEX	µg/L	3	<3	<3
Naphthalene	µg/L	0.5	<0.5	<0.5

Volatile Petroleum Hydrocarbons in Water [AN433] Tested: 26/4/2019

			FB01	Rinsate_170419
			WATER	WATER
			-	-
			17/4/2019	17/4/2019
PARAMETER	**UOM**	**LOR**	**SE192028.038**	**SE192028.041**
TRH C6-C9	µg/L	40	<40	<40
Benzene (F0)	µg/L	0.5	<0.5	<0.5
TRH C6-C10	µg/L	50	<50	<50
TRH C6-C10 minus BTEX (F1)	µg/L	50	<50	<50

TRH (Total Recoverable Hydrocarbons) in Water [AN403] Tested: 26/4/2019

PARAMETER	UOM	LOR	Rinsate_170419 WATER - 17/4/2019 SE192028.041
TRH C10-C14	µg/L	50	<50
TRH C15-C28	µg/L	200	<200
TRH C29-C36	µg/L	200	<200
TRH C37-C40	µg/L	200	<200
TRH >C10-C16	µg/L	60	<60
TRH >C16-C34 (F3)	µg/L	500	<500
TRH >C34-C40 (F4)	µg/L	500	<500
TRH C10-C36	µg/L	450	<450
TRH C10-C40	µg/L	650	<650
TRH >C10-C16 - Naphthalene (F2)	µg/L	60	<60

PAH (Polynuclear Aromatic Hydrocarbons) in Water [AN420] Tested: 26/4/2019

PARAMETER	UOM	LOR	Rinsate_170419 WATER - 17/4/2019 SE192028.041
Naphthalene	µg/L	0.1	<0.1
2-methylnaphthalene	µg/L	0.1	<0.1
1-methylnaphthalene	µg/L	0.1	<0.1
Acenaphthylene	µg/L	0.1	<0.1
Acenaphthene	µg/L	0.1	<0.1
Fluorene	µg/L	0.1	<0.1
Phenanthrene	µg/L	0.1	<0.1
Anthracene	µg/L	0.1	<0.1
Fluoranthene	µg/L	0.1	<0.1
Pyrene	µg/L	0.1	<0.1
Benzo(a)anthracene	µg/L	0.1	<0.1
Chrysene	µg/L	0.1	<0.1
Benzo(b&j)fluoranthene	µg/L	0.1	<0.1
Benzo(k)fluoranthene	µg/L	0.1	<0.1
Benzo(a)pyrene	µg/L	0.1	<0.1
Indeno(1,2,3-cd)pyrene	µg/L	0.1	<0.1
Dibenzo(ah)anthracene	µg/L	0.1	<0.1
Benzo(ghi)perylene	µg/L	0.1	<0.1
Total PAH (18)	µg/L	1	<1

OC Pesticides in Water [AN420] Tested: 26/4/2019

			Rinsate_170419 WATER - 17/4/2019
PARAMETER	**UOM**	**LOR**	**SE192028.041**
Alpha BHC	µg/L	0.1	<0.1
Hexachlorobenzene (HCB)	µg/L	0.1	<0.1
Beta BHC	µg/L	0.1	<0.1
Lindane (gamma BHC)	µg/L	0.1	<0.1
Delta BHC	µg/L	0.1	<0.1
Heptachlor	µg/L	0.1	<0.1
Aldrin	µg/L	0.1	<0.1
Heptachlor epoxide	µg/L	0.1	<0.1
Gamma Chlordane	µg/L	0.1	<0.1
Alpha Chlordane	µg/L	0.1	<0.1
Alpha Endosulfan	µg/L	0.1	<0.1
o,p'-DDE	µg/L	0.1	<0.1
p,p'-DDE	µg/L	0.1	<0.1
Dieldrin	µg/L	0.1	<0.1
Endrin	µg/L	0.1	<0.1
Beta Endosulfan	µg/L	0.1	<0.1
o,p'-DDD	µg/L	0.1	<0.1
p,p'-DDD	µg/L	0.1	<0.1
Endosulfan sulphate	µg/L	0.1	<0.1
o,p'-DDT	µg/L	0.1	<0.1
p,p'-DDT	µg/L	0.1	<0.1
Endrin ketone	µg/L	0.1	<0.1
Methoxychlor	µg/L	0.1	<0.1
trans-Nonachlor	µg/L	0.1	<0.1
Endrin aldehyde	µg/L	0.1	<0.1
Isodrin	µg/L	0.1	<0.1
Mirex	µg/L	0.1	<0.1

OP Pesticides in Water [AN420] Tested: 26/4/2019

			Rinsate_170419 WATER - 17/4/2019
PARAMETER	UOM	LOR	SE192028.041
Dichlorvos	µg/L	0.5	<0.5
Dimethoate	µg/L	0.5	<0.5
Diazinon (Dimpylate)	µg/L	0.5	<0.5
Fenitrothion	µg/L	0.2	<0.2
Malathion	µg/L	0.2	<0.2
Chlorpyrifos (Chlorpyrifos Ethyl)	µg/L	0.2	<0.2
Parathion-ethyl (Parathion)	µg/L	0.2	<0.2
Bromophos Ethyl	µg/L	0.2	<0.2
Methidathion	µg/L	0.5	<0.5
Ethion	µg/L	0.2	<0.2
Azinphos-methyl	µg/L	0.2	<0.2

PCBs in Water [AN420] Tested: 26/4/2019

PARAMETER	UOM	LOR	Rinsate_170419 WATER - 17/4/2019 SE192028.041
Arochlor 1016	μg/L	1	<1
Arochlor 1221	μg/L	1	<1
Arochlor 1232	μg/L	1	<1
Arochlor 1242	μg/L	1	<1
Arochlor 1248	μg/L	1	<1
Arochlor 1254	μg/L	1	<1
Arochlor 1260	μg/L	1	<1
Arochlor 1262	μg/L	1	<1
Arochlor 1268	μg/L	1	<1
Total Arochlors*	μg/L	5	<5

Trace Metals (Dissolved) in Water by ICPMS [AN318] Tested: 29/4/2019

PARAMETER	UOM	LOR	Rinsate_170419 WATER - 17/4/2019 SE192028.041
Arsenic, As	µg/L	1	<1
Cadmium, Cd	µg/L	0.1	<0.1
Chromium, Cr	µg/L	1	<1
Copper, Cu	µg/L	1	<1
Lead, Pb	µg/L	1	<1
Nickel, Ni	µg/L	1	<1
Zinc, Zn	µg/L	5	<5

Mercury (dissolved) in Water [AN311(Perth)/AN312] Tested: 29/4/2019

			Rinsate_170419 WATER - 17/4/2019
PARAMETER	**UOM**	**LOR**	**SE192028.041**
Mercury	mg/L	0.0001	<0.0001

METHOD	METHODOLOGY SUMMARY
AN002	The test is carried out by drying (at either 40°C or 105°C) a known mass of sample in a weighed evaporating basin. After fully dry the sample is re-weighed. Samples such as sludge and sediment having high percentages of moisture will take some time in a drying oven for complete removal of water.
AN020	Unpreserved water sample is filtered through a 0.45µm membrane filter and acidified with nitric acid similar to APHA3030B.
AN040/AN320	A portion of sample is digested with nitric acid to decompose organic matter and hydrochloric acid to complete the digestion of metals. The digest is then analysed by ICP OES with metals results reported on the dried sample basis. Based on USEPA method 200.8 and 6010C.
AN040	A portion of sample is digested with Nitric acid to decompose organic matter and Hydrochloric acid to complete the digestion of metals and then filtered for analysis by ASS or ICP as per USEPA Method 200.8.
AN311(Perth)/AN312	Mercury by Cold Vapour AAS in Waters: Mercury ions are reduced by stannous chloride reagent in acidic solution to elemental mercury. This mercury vapour is purged by nitrogen into a cold cell in an atomic absorption spectrometer or mercury analyser. Quantification is made by comparing absorbances to those of the calibration standards. Reference APHA 3112/3500.
AN312	Mercury by Cold Vapour AAS in Soils: After digestion with nitric acid, hydrogen peroxide and hydrochloric acid , mercury ions are reduced by stannous chloride reagent in acidic solution to elemental mercury. This mercury vapour is purged by nitrogen into a cold cell in an atomic absorption spectrometer or mercury analyser . Quantification is made by comparing absorbances to those of the calibration standards. Reference APHA 3112/3500
AN318	Determination of elements at trace level in waters by ICP-MS technique, in accordance with USEPA 6020A.
AN403	Total Recoverable Hydrocarbons: Determination of Hydrocarbons by gas chromatography after a solvent extraction. Detection is by flame ionisation detector (FID) that produces an electronic signal in proportion to the combustible matter passing through it. Total Recoverable Hydrocarbons (TRH) are routinely reported as four alkane groupings based on the carbon chain length of the compounds: C6-C9, C10-C14, C15-C28 and C29-C36 and in recognition of the NEPM 1999 (2013), >C10-C16 (F2), >C16-C34 (F3) and >C34-C40 (F4). F2 is reported directly and also corrected by subtracting Naphthalene (from VOC method AN433) where available.
AN403	Additionally, the volatile C6-C9 fraction may be determined by a purge and trap technique and GC /MS because of the potential for volatiles loss. Total Recoverable Hydrocarbons - Silica (TRH-Si) follows the same method of analysis after silica gel cleanup of the solvent extract. Aliphatic/Aromatic Speciation follows the same method of analysis after fractionation of the solvent extract over silica with differential polarity of the eluent solvents .
AN403	The GC/FID method is not well suited to the analysis of refined high boiling point materials (ie lubricating oils or greases) but is particularly suited for measuring diesel, kerosene and petrol if care to control volatility is taken. This method will detect naturally occurring hydrocarbons, lipids, animal fats, phenols and PAHs if they are present at sufficient levels, dependent on the use of specific cleanup /fractionation techniques. Reference USEPA 3510B, 8015B.
AN420	(SVOCs) including OC, OP, PCB, Herbicides, PAH, Phthalates and Speciated Phenols (etc) in soils, sediments and waters are determined by GCMS/ECD technique following appropriate solvent extraction process (Based on USEPA 3500C and 8270D).
AN420	SVOC Compounds: Semi-Volatile Organic Compounds (SVOCs) including OC, OP, PCB, Herbicides, PAH, Phthalates and Speciated Phenols in soils, sediments and waters are determined by GCMS /ECD technique following appropriate solvent extraction process (Based on USEPA 3500C and 8270D).
AN433	VOCs and C6-C9 Hydrocarbons by GC-MS P&T: VOC`s are volatile organic compounds. The sample is presented to a gas chromatograph via a purge and trap (P&T) concentrator and autosampler and is detected with a Mass Spectrometer (MSD). Solid samples are initially extracted with methanol whilst liquid samples are processed directly. References: USEPA 5030B, 8020A, 8260.
AN602	Qualitative identification of chrysotile, amosite and crocidolite in bulk samples by polarised light microscopy (PLM) in conjunction with dispersion staining (DS). AS4964 provides the basis for this document. Unequivocal identification of the asbestos minerals present is made by obtaining sufficient diagnostic `clues`, which provide a reasonable degree of certainty, dispersion staining is a mandatory `clue` for positive identification. If sufficient `clues` are absent, then positive identification of asbestos is not possible. This procedure requires removal of suspect fibres/bundles from the sample which cannot be returned.
AN602	Fibres/material that cannot be unequivocably identified as one of the three asbestos forms, will be reported as unknown mineral fibres (umf) The fibres detected may or may not be asbestos fibres.
AN602	AS4964.2004 Method for the Qualitative Identification of Asbestos in Bulk Samples, Section 8.4, Trace Analysis Criteria, Note 4 states:"Depending upon sample condition and fibre type, the detection limit of this technique has been found to lie generally in the range of 1 in 1,000 to 1 in 10,000 parts by weight, equivalent to 1 to 0.1 g/kg."

AN602	The sample can be reported “no asbestos found at the reporting limit of 0.1 g/kg” (<0.01%w/w) where AN602 section 4.5 of this method has been followed, and if- (a) no trace asbestos fibres have been detected (i.e. no ‘respirable’ fibres): (b) the estimated weight of non-respirable asbestos fibre bundles and/or the estimated weight of asbestos in asbestos-containing materials are found to be less than 0.1g/kg: and (c) these non-respirable asbestos fibre bundles and/or the asbestos containing materials are only visible under stereo-microscope viewing conditions.
AN605	This technique gravimetrically determines the mass of Asbestos Containing Material retained on a 7mm Sieve and assumes that 15% of this ACM is asbestos. This calculated asbestos weight is then calculated as a percentage of the total sample weight.
AN605	This technique also gravimetrically determines the mass of Fibrous Asbestos (FA) and Asbestos Fines (AF) Containing Material retained on and passing a 2mm sieve post 7mm sieving. Assumes that FA and AF are 100% asbestos containing. This calculated asbestos weight is then calculated as a percentage of the total sample weight. This does not include free fibres which are only observed by standard trace analysis as per AN 602.
AN605	Insofar as is technically feasible, this report is consistent with the analytical reporting recommendations in the Western Australian Department of Health Guidelines for the Assessment Remediation and Management of Asbestos - Contaminated Sites in Western Australia - May 2009.

FOOTNOTES

*	NATA accreditation does not cover the performance of this service.	-	Not analysed.	UOM	Unit of Measure.
		NVL	Not validated.	LOR	Limit of Reporting.
**	Indicative data, theoretical holding time exceeded.	IS	Insufficient sample for analysis.	↑↓	Raised/lowered Limit of Reporting.
		LNR	Sample listed, but not received.		

Unless it is reported that sampling has been perfomed by SGS, the samples have been analysed as received.
Solid samples expressed on a dry weight basis.

Where "Total" analyte groups are reported (for example, Total PAHs, Total OC Pesticides) the total will be calculated as the sum of the individual analytes, with those analytes that are reported as <LOR being assumed to be zero. The summed (Total) limit of reporting is calculated by summing the individual analyte LORs and dividing by two. For example, where 16 individual analytes are being summed and each has an LOR of 0.1 mg/kg, the "Totals" LOR will be 1.6 / 2 (0.8 mg/kg). Where only 2 analytes are being summed, the " Total" LOR will be the sum of those two LORs.

Some totals may not appear to add up because the total is rounded after adding up the raw values.

If reported, measurement uncertainty follow the ± sign after the analytical result and is expressed as the expanded uncertainty calculated using a coverage factor of 2, providing a level of confidence of approximately 95%, unless stated otherwise in the comments section of this report.

Results reported for samples tested under test methods with codes starting with ARS-SOP, radionuclide or gross radioactivity concentrations are expressed in becquerel (Bq) per unit of mass or volume or per wipe as stated on the report. Becquerel is the SI unit for activity and equals one nuclear transformation per second.
Note that in terms of units of radioactivity:
a. 1 Bq is equivalent to 27 pCi
b. 37 MBq is equivalent to 1 mCi

For results reported for samples tested under test methods with codes starting with ARS-SOP, less than (<) values indicate the detection limit for each radionuclide or parameter for the measurement system used. The respective detection limits have been calculated in accordance with ISO 11929.

The QC and MU criteria are subject to internal review according to the SGS QAQC plan and may be provided on request or alternatively can be found here: www.sgs.com.au.pv.sgsvr/en-gb/environment.

STATEMENT OF QA/QC PERFORMANCE

SE192028 R1

CLIENT DETAILS

Contact	Alex Hannan-Joyner
Client	Robson Environmental Pty Ltd
Address	140 Gladstone Street, FYSHWICK PO Box 112, FYSHWICK ACT 2609
Telephone	(02) 6239 5656
Facsimile	(02) 6239 5669
Email	alex@robsonenviro.com.au
Project	**J17188**
Order Number	(Not specified)
Samples	41

LABORATORY DETAILS

Manager	Huong Crawford
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Email	au.environmental.sydney@sgs.com
SGS Reference	**SE192028 R1**
Date Received	24 Apr 2019
Date Reported	09 May 2019

COMMENTS

All the laboratory data for each environmental matrix was compared to SGS' stated Data Quality Objectives (DQO). Comments arising from the comparison were made and are reported below.

The data relating to sampling was taken from the Chain of Custody document.
This QA/QC Statement must be read in conjunction with the referenced Analytical Report.
The Statement and the Analytical Report must not be reproduced except in full.

All Data Quality Objectives were met with the exception of the following:

Extraction Date	OC Pesticides in Water	1 item
	OP Pesticides in Water	1 item
	PAH (Polynuclear Aromatic Hydrocarbons) in Water	1 item
	PCBs in Water	1 item
	TRH (Total Recoverable Hydrocarbons) in Water	1 item
	VOCs in Water	2 items
	Volatile Petroleum Hydrocarbons in Water	2 items
Duplicate	Mercury in Soil	1 item
	Total Recoverable Elements in Soil/Waste Solids/Materials by ICPOES	2 items
	Total Recoverable Elements in Soil/Waste Solids/Materials by ICPOES	1 item

SAMPLE SUMMARY

Samples clearly labelled	Yes	Complete documentation received	Yes
Sample container provider	SGS	Sample cooling method	Ice Bricks
Samples received in correct containers	Yes	Sample counts by matrix	39 Soil, 2 Water
Date documentation received	24/4/2019	Type of documentation received	COC
Samples received in good order	Yes	Samples received without headspace	Yes
Sample temperature upon receipt	6.7°C	Sufficient sample for analysis	Yes
Turnaround time requested	Two Days		

SGS holding time criteria are drawn from current regulations and are highly dependent on sample container preservation as specified in the SGS “Field Sampling Guide for Containers and Holding Time” (ref: GU-(AU)-ENV.001). Soil samples guidelines are derived from NEPM "Schedule B(3) Guideline on Laboratory Analysis of Potentially Contaminated Soils". Water sample guidelines are derived from "AS/NZS 5667.1 : 1998 Water Quality - sampling part 1" and APHA "Standard Methods for the Examination of Water and Wastewater" 21st edition 2005.

Extraction and analysis holding time due dates listed are calculated from the date sampled, although holding times may be extended after laboratory extraction for some analytes. The due dates are the suggested dates that samples may be held before extraction or analysis and still be considered valid.

Extraction and analysis dates are shown in **Green** when within suggested criteria or **Red** with an appended dagger symbol (†) when outside suggested criteria. If the sampled date is not supplied then compliance with criteria cannot be determined. If the received date is after one or both due dates then holding time will fail by default.

Fibre Identification in soil

Method: ME-(AU)-[ENV]AN602

Sample Name	Sample No.	QC Ref	Sampled	Received	Extraction Due	Extracted	Analysis Due	Analysed
S01_0-0.1	SE192028.001	LB172313	17 Apr 2019	24 Apr 2019	16 Apr 2020	26 Apr 2019	16 Apr 2020	29 Apr 2019
S02_0-0.1	SE192028.002	LB172313	17 Apr 2019	24 Apr 2019	16 Apr 2020	26 Apr 2019	16 Apr 2020	29 Apr 2019
S05_0-0.1	SE192028.007	LB172313	17 Apr 2019	24 Apr 2019	16 Apr 2020	26 Apr 2019	16 Apr 2020	29 Apr 2019
S07_0-0.1	SE192028.011	LB172313	17 Apr 2019	24 Apr 2019	16 Apr 2020	26 Apr 2019	16 Apr 2020	29 Apr 2019
S08_0-0.1	SE192028.012	LB172313	17 Apr 2019	24 Apr 2019	16 Apr 2020	26 Apr 2019	16 Apr 2020	29 Apr 2019
S10_0-0.1	SE192028.015	LB172313	17 Apr 2019	24 Apr 2019	16 Apr 2020	26 Apr 2019	16 Apr 2020	29 Apr 2019
S11_0-0.1	SE192028.016	LB172313	17 Apr 2019	24 Apr 2019	16 Apr 2020	26 Apr 2019	16 Apr 2020	29 Apr 2019
S12_0-0.1	SE192028.018	LB172313	17 Apr 2019	24 Apr 2019	16 Apr 2020	26 Apr 2019	16 Apr 2020	29 Apr 2019
S14_0-0.1	SE192028.020	LB172313	17 Apr 2019	24 Apr 2019	16 Apr 2020	26 Apr 2019	16 Apr 2020	29 Apr 2019
S16_0-0.1	SE192028.023	LB172313	17 Apr 2019	24 Apr 2019	16 Apr 2020	26 Apr 2019	16 Apr 2020	29 Apr 2019
S18_0-0.1	SE192028.025	LB172313	17 Apr 2019	24 Apr 2019	16 Apr 2020	26 Apr 2019	16 Apr 2020	29 Apr 2019
S19_0-0.1	SE192028.026	LB172313	17 Apr 2019	24 Apr 2019	16 Apr 2020	26 Apr 2019	16 Apr 2020	29 Apr 2019
S20_0-0.1	SE192028.028	LB172313	17 Apr 2019	24 Apr 2019	16 Apr 2020	26 Apr 2019	16 Apr 2020	29 Apr 2019
S23_0-0.1	SE192028.032	LB172313	17 Apr 2019	24 Apr 2019	16 Apr 2020	26 Apr 2019	16 Apr 2020	29 Apr 2019
S24_0-0.1	SE192028.033	LB172313	17 Apr 2019	24 Apr 2019	16 Apr 2020	26 Apr 2019	16 Apr 2020	29 Apr 2019
S25_0-0.2	SE192028.034	LB172313	17 Apr 2019	24 Apr 2019	16 Apr 2020	26 Apr 2019	16 Apr 2020	29 Apr 2019
S26_0-0.2	SE192028.035	LB172313	17 Apr 2019	24 Apr 2019	16 Apr 2020	26 Apr 2019	16 Apr 2020	29 Apr 2019

Gravimetric Determination of Asbestos in Soil

Method: ME-(AU)-[ENV]AN605

Sample Name	Sample No.	QC Ref	Sampled	Received	Extraction Due	Extracted	Analysis Due	Analysed
S01_0-0.1	SE192028.001	LB172313	17 Apr 2019	24 Apr 2019	14 Oct 2019	26 Apr 2019	14 Oct 2019	29 Apr 2019
S02_0-0.1	SE192028.002	LB172313	17 Apr 2019	24 Apr 2019	14 Oct 2019	26 Apr 2019	14 Oct 2019	29 Apr 2019
S05_0-0.1	SE192028.007	LB172313	17 Apr 2019	24 Apr 2019	14 Oct 2019	26 Apr 2019	14 Oct 2019	29 Apr 2019
S07_0-0.1	SE192028.011	LB172313	17 Apr 2019	24 Apr 2019	14 Oct 2019	26 Apr 2019	14 Oct 2019	29 Apr 2019
S08_0-0.1	SE192028.012	LB172313	17 Apr 2019	24 Apr 2019	14 Oct 2019	26 Apr 2019	14 Oct 2019	29 Apr 2019
S10_0-0.1	SE192028.015	LB172313	17 Apr 2019	24 Apr 2019	14 Oct 2019	26 Apr 2019	14 Oct 2019	29 Apr 2019
S11_0-0.1	SE192028.016	LB172313	17 Apr 2019	24 Apr 2019	14 Oct 2019	26 Apr 2019	14 Oct 2019	29 Apr 2019
S12_0-0.1	SE192028.018	LB172313	17 Apr 2019	24 Apr 2019	14 Oct 2019	26 Apr 2019	14 Oct 2019	29 Apr 2019
S14_0-0.1	SE192028.020	LB172313	17 Apr 2019	24 Apr 2019	14 Oct 2019	26 Apr 2019	14 Oct 2019	29 Apr 2019
S16_0-0.1	SE192028.023	LB172313	17 Apr 2019	24 Apr 2019	14 Oct 2019	26 Apr 2019	14 Oct 2019	29 Apr 2019
S18_0-0.1	SE192028.025	LB172313	17 Apr 2019	24 Apr 2019	14 Oct 2019	26 Apr 2019	14 Oct 2019	29 Apr 2019
S19_0-0.1	SE192028.026	LB172313	17 Apr 2019	24 Apr 2019	14 Oct 2019	26 Apr 2019	14 Oct 2019	29 Apr 2019
S20_0-0.1	SE192028.028	LB172313	17 Apr 2019	24 Apr 2019	14 Oct 2019	26 Apr 2019	14 Oct 2019	29 Apr 2019
S23_0-0.1	SE192028.032	LB172313	17 Apr 2019	24 Apr 2019	14 Oct 2019	26 Apr 2019	14 Oct 2019	29 Apr 2019
S24_0-0.1	SE192028.033	LB172313	17 Apr 2019	24 Apr 2019	14 Oct 2019	26 Apr 2019	14 Oct 2019	29 Apr 2019
S25_0-0.2	SE192028.034	LB172313	17 Apr 2019	24 Apr 2019	14 Oct 2019	26 Apr 2019	14 Oct 2019	29 Apr 2019
S26_0-0.2	SE192028.035	LB172313	17 Apr 2019	24 Apr 2019	14 Oct 2019	26 Apr 2019	14 Oct 2019	29 Apr 2019

Mercury (dissolved) in Water

Method: ME-(AU)-[ENV]AN311(Perth)/AN312

Sample Name	Sample No.	QC Ref	Sampled	Received	Extraction Due	Extracted	Analysis Due	Analysed
Rinsate_170419	SE192028.041	LB172370	17 Apr 2019	24 Apr 2019	15 May 2019	29 Apr 2019	15 May 2019	29 Apr 2019

Mercury in Soil

Method: ME-(AU)-[ENV]AN312

Sample Name	Sample No.	QC Ref	Sampled	Received	Extraction Due	Extracted	Analysis Due	Analysed
S01_0-0.1	SE192028.001	LB172303	17 Apr 2019	24 Apr 2019	15 May 2019	26 Apr 2019	15 May 2019	29 Apr 2019
S02_0-0.1	SE192028.002	LB172303	17 Apr 2019	24 Apr 2019	15 May 2019	26 Apr 2019	15 May 2019	29 Apr 2019
S02_0.4-0.5	SE192028.003	LB172303	17 Apr 2019	24 Apr 2019	15 May 2019	26 Apr 2019	15 May 2019	29 Apr 2019
S03_0-0.1	SE192028.004	LB172303	17 Apr 2019	24 Apr 2019	15 May 2019	26 Apr 2019	15 May 2019	29 Apr 2019
S04_0-0.1	SE192028.005	LB172303	17 Apr 2019	24 Apr 2019	15 May 2019	26 Apr 2019	15 May 2019	29 Apr 2019
S04_-0.4-0.5	SE192028.006	LB172303	17 Apr 2019	24 Apr 2019	15 May 2019	26 Apr 2019	15 May 2019	29 Apr 2019
S05_0-0.1	SE192028.007	LB172303	17 Apr 2019	24 Apr 2019	15 May 2019	26 Apr 2019	15 May 2019	29 Apr 2019
S05_0.4-0.5	SE192028.008	LB172303	17 Apr 2019	24 Apr 2019	15 May 2019	26 Apr 2019	15 May 2019	29 Apr 2019
S06_0-0.1	SE192028.009	LB172303	17 Apr 2019	24 Apr 2019	15 May 2019	26 Apr 2019	15 May 2019	29 Apr 2019
S06_0.4-0.5	SE192028.010	LB172303	17 Apr 2019	24 Apr 2019	15 May 2019	26 Apr 2019	15 May 2019	29 Apr 2019
S07_0-0.1	SE192028.011	LB172303	17 Apr 2019	24 Apr 2019	15 May 2019	26 Apr 2019	15 May 2019	29 Apr 2019
S08_0-0.1	SE192028.012	LB172303	17 Apr 2019	24 Apr 2019	15 May 2019	26 Apr 2019	15 May 2019	29 Apr 2019
S08_0.3-0.4	SE192028.013	LB172303	17 Apr 2019	24 Apr 2019	15 May 2019	26 Apr 2019	15 May 2019	29 Apr 2019
S09_0-0.1	SE192028.014	LB172303	17 Apr 2019	24 Apr 2019	15 May 2019	26 Apr 2019	15 May 2019	29 Apr 2019
S10_0-0.1	SE192028.015	LB172303	17 Apr 2019	24 Apr 2019	15 May 2019	26 Apr 2019	15 May 2019	29 Apr 2019
S11_0-0.1	SE192028.016	LB172303	17 Apr 2019	24 Apr 2019	15 May 2019	26 Apr 2019	15 May 2019	29 Apr 2019

SGS holding time criteria are drawn from current regulations and are highly dependent on sample container preservation as specified in the SGS “Field Sampling Guide for Containers and Holding Time” (ref: GU-(AU)-ENV.001). Soil samples guidelines are derived from NEPM "Schedule B(3) Guideline on Laboratory Analysis of Potentially Contaminated Soils". Water sample guidelines are derived from "AS/NZS 5667.1 : 1998 Water Quality - sampling part 1" and APHA "Standard Methods for the Examination of Water and Wastewater" 21st edition 2005.

Extraction and analysis holding time due dates listed are calculated from the date sampled, although holding times may be extended after laboratory extraction for some analytes. The due dates are the suggested dates that samples may be held before extraction or analysis and still be considered valid.

Extraction and analysis dates are shown in **Green** when within suggested criteria or **Red** with an appended dagger symbol (†) when outside suggested criteria. If the sampled date is not supplied then compliance with criteria cannot be determined. If the received date is after one or both due dates then holding time will fail by default.

Mercury in Soil (continued)

Method: ME-(AU)-[ENV]AN312

Sample Name	Sample No.	QC Ref	Sampled	Received	Extraction Due	Extracted	Analysis Due	Analysed
S11_0.4-0.5	SE192028.017	LB172303	17 Apr 2019	24 Apr 2019	15 May 2019	26 Apr 2019	15 May 2019	29 Apr 2019
S12_0-0.1	SE192028.018	LB172303	17 Apr 2019	24 Apr 2019	15 May 2019	26 Apr 2019	15 May 2019	29 Apr 2019
S13_0-0.1	SE192028.019	LB172303	17 Apr 2019	24 Apr 2019	15 May 2019	26 Apr 2019	15 May 2019	29 Apr 2019
S14_0-0.1	SE192028.020	LB172305	17 Apr 2019	24 Apr 2019	15 May 2019	26 Apr 2019	15 May 2019	29 Apr 2019
S14_0.4-0.5	SE192028.021	LB172305	17 Apr 2019	24 Apr 2019	15 May 2019	26 Apr 2019	15 May 2019	29 Apr 2019
S15_0-0.1	SE192028.022	LB172305	17 Apr 2019	24 Apr 2019	15 May 2019	26 Apr 2019	15 May 2019	29 Apr 2019
S16_0-0.1	SE192028.023	LB172305	17 Apr 2019	24 Apr 2019	15 May 2019	26 Apr 2019	15 May 2019	29 Apr 2019
S17_0-0.1	SE192028.024	LB172305	17 Apr 2019	24 Apr 2019	15 May 2019	26 Apr 2019	15 May 2019	29 Apr 2019
S18_0-0.1	SE192028.025	LB172305	17 Apr 2019	24 Apr 2019	15 May 2019	26 Apr 2019	15 May 2019	29 Apr 2019
S19_0-0.1	SE192028.026	LB172305	17 Apr 2019	24 Apr 2019	15 May 2019	26 Apr 2019	15 May 2019	29 Apr 2019
S19_0.4-0.5	SE192028.027	LB172305	17 Apr 2019	24 Apr 2019	15 May 2019	26 Apr 2019	15 May 2019	29 Apr 2019
S20_0-0.1	SE192028.028	LB172305	17 Apr 2019	24 Apr 2019	15 May 2019	26 Apr 2019	15 May 2019	29 Apr 2019
S20_0.4-0.5	SE192028.029	LB172305	17 Apr 2019	24 Apr 2019	15 May 2019	26 Apr 2019	15 May 2019	29 Apr 2019
S21_0-0.1	SE192028.030	LB172305	17 Apr 2019	24 Apr 2019	15 May 2019	26 Apr 2019	15 May 2019	29 Apr 2019
S22_0-0.1	SE192028.031	LB172305	17 Apr 2019	24 Apr 2019	15 May 2019	26 Apr 2019	15 May 2019	29 Apr 2019
S23_0-0.1	SE192028.032	LB172305	17 Apr 2019	24 Apr 2019	15 May 2019	26 Apr 2019	15 May 2019	29 Apr 2019
S24_0-0.1	SE192028.033	LB172305	17 Apr 2019	24 Apr 2019	15 May 2019	26 Apr 2019	15 May 2019	29 Apr 2019
S25_0-0.2	SE192028.034	LB172305	17 Apr 2019	24 Apr 2019	15 May 2019	26 Apr 2019	15 May 2019	29 Apr 2019
S26_0-0.2	SE192028.035	LB172305	17 Apr 2019	24 Apr 2019	15 May 2019	26 Apr 2019	15 May 2019	29 Apr 2019
QC01	SE192028.036	LB172305	17 Apr 2019	24 Apr 2019	15 May 2019	26 Apr 2019	15 May 2019	29 Apr 2019
QC03	SE192028.037	LB172305	17 Apr 2019	24 Apr 2019	15 May 2019	26 Apr 2019	15 May 2019	29 Apr 2019

Moisture Content

Method: ME-(AU)-[ENV]AN002

Sample Name	Sample No.	QC Ref	Sampled	Received	Extraction Due	Extracted	Analysis Due	Analysed
S01_0-0.1	SE192028.001	LB172306	17 Apr 2019	24 Apr 2019	01 May 2019	26 Apr 2019	01 May 2019	29 Apr 2019
S02_0-0.1	SE192028.002	LB172306	17 Apr 2019	24 Apr 2019	01 May 2019	26 Apr 2019	01 May 2019	29 Apr 2019
S02_0.4-0.5	SE192028.003	LB172306	17 Apr 2019	24 Apr 2019	01 May 2019	26 Apr 2019	01 May 2019	29 Apr 2019
S03_0-0.1	SE192028.004	LB172306	17 Apr 2019	24 Apr 2019	01 May 2019	26 Apr 2019	01 May 2019	29 Apr 2019
S04_0-0.1	SE192028.005	LB172306	17 Apr 2019	24 Apr 2019	01 May 2019	26 Apr 2019	01 May 2019	29 Apr 2019
S04_-0.4-0.5	SE192028.006	LB172306	17 Apr 2019	24 Apr 2019	01 May 2019	26 Apr 2019	01 May 2019	29 Apr 2019
S05_0-0.1	SE192028.007	LB172306	17 Apr 2019	24 Apr 2019	01 May 2019	26 Apr 2019	01 May 2019	29 Apr 2019
S05_0.4-0.5	SE192028.008	LB172306	17 Apr 2019	24 Apr 2019	01 May 2019	26 Apr 2019	01 May 2019	29 Apr 2019
S06_0-0.1	SE192028.009	LB172306	17 Apr 2019	24 Apr 2019	01 May 2019	26 Apr 2019	01 May 2019	29 Apr 2019
S06_0.4-0.5	SE192028.010	LB172306	17 Apr 2019	24 Apr 2019	01 May 2019	26 Apr 2019	01 May 2019	29 Apr 2019
S07_0-0.1	SE192028.011	LB172306	17 Apr 2019	24 Apr 2019	01 May 2019	26 Apr 2019	01 May 2019	29 Apr 2019
S08_0-0.1	SE192028.012	LB172306	17 Apr 2019	24 Apr 2019	01 May 2019	26 Apr 2019	01 May 2019	29 Apr 2019
S08_0.3-0.4	SE192028.013	LB172306	17 Apr 2019	24 Apr 2019	01 May 2019	26 Apr 2019	01 May 2019	29 Apr 2019
S09_0-0.1	SE192028.014	LB172306	17 Apr 2019	24 Apr 2019	01 May 2019	26 Apr 2019	01 May 2019	29 Apr 2019
S10_0-0.1	SE192028.015	LB172306	17 Apr 2019	24 Apr 2019	01 May 2019	26 Apr 2019	01 May 2019	29 Apr 2019
S11_0-0.1	SE192028.016	LB172306	17 Apr 2019	24 Apr 2019	01 May 2019	26 Apr 2019	01 May 2019	29 Apr 2019
S11_0.4-0.5	SE192028.017	LB172306	17 Apr 2019	24 Apr 2019	01 May 2019	26 Apr 2019	01 May 2019	29 Apr 2019
S12_0-0.1	SE192028.018	LB172306	17 Apr 2019	24 Apr 2019	01 May 2019	26 Apr 2019	01 May 2019	29 Apr 2019
S13_0-0.1	SE192028.019	LB172306	17 Apr 2019	24 Apr 2019	01 May 2019	26 Apr 2019	01 May 2019	29 Apr 2019
S14_0-0.1	SE192028.020	LB172307	17 Apr 2019	24 Apr 2019	01 May 2019	26 Apr 2019	01 May 2019	29 Apr 2019
S14_0.4-0.5	SE192028.021	LB172307	17 Apr 2019	24 Apr 2019	01 May 2019	26 Apr 2019	01 May 2019	29 Apr 2019
S15_0-0.1	SE192028.022	LB172307	17 Apr 2019	24 Apr 2019	01 May 2019	26 Apr 2019	01 May 2019	29 Apr 2019
S16_0-0.1	SE192028.023	LB172307	17 Apr 2019	24 Apr 2019	01 May 2019	26 Apr 2019	01 May 2019	29 Apr 2019
S17_0-0.1	SE192028.024	LB172307	17 Apr 2019	24 Apr 2019	01 May 2019	26 Apr 2019	01 May 2019	29 Apr 2019
S18_0-0.1	SE192028.025	LB172307	17 Apr 2019	24 Apr 2019	01 May 2019	26 Apr 2019	01 May 2019	29 Apr 2019
S19_0-0.1	SE192028.026	LB172307	17 Apr 2019	24 Apr 2019	01 May 2019	26 Apr 2019	01 May 2019	29 Apr 2019
S19_0.4-0.5	SE192028.027	LB172307	17 Apr 2019	24 Apr 2019	01 May 2019	26 Apr 2019	01 May 2019	29 Apr 2019
S20_0-0.1	SE192028.028	LB172307	17 Apr 2019	24 Apr 2019	01 May 2019	26 Apr 2019	01 May 2019	29 Apr 2019
S20_0.4-0.5	SE192028.029	LB172307	17 Apr 2019	24 Apr 2019	01 May 2019	26 Apr 2019	01 May 2019	29 Apr 2019
S21_0-0.1	SE192028.030	LB172307	17 Apr 2019	24 Apr 2019	01 May 2019	26 Apr 2019	01 May 2019	29 Apr 2019
S22_0-0.1	SE192028.031	LB172307	17 Apr 2019	24 Apr 2019	01 May 2019	26 Apr 2019	01 May 2019	29 Apr 2019
S23_0-0.1	SE192028.032	LB172307	17 Apr 2019	24 Apr 2019	01 May 2019	26 Apr 2019	01 May 2019	29 Apr 2019
S24_0-0.1	SE192028.033	LB172307	17 Apr 2019	24 Apr 2019	01 May 2019	26 Apr 2019	01 May 2019	29 Apr 2019
S25_0-0.2	SE192028.034	LB172307	17 Apr 2019	24 Apr 2019	01 May 2019	26 Apr 2019	01 May 2019	29 Apr 2019
S26_0-0.2	SE192028.035	LB172307	17 Apr 2019	24 Apr 2019	01 May 2019	26 Apr 2019	01 May 2019	29 Apr 2019
QC01	SE192028.036	LB172307	17 Apr 2019	24 Apr 2019	01 May 2019	26 Apr 2019	01 May 2019	29 Apr 2019

SGS holding time criteria are drawn from current regulations and are highly dependent on sample container preservation as specified in the SGS “Field Sampling Guide for Containers and Holding Time” (ref: GU-(AU)-ENV.001). Soil samples guidelines are derived from NEPM "Schedule B(3) Guideline on Laboratory Analysis of Potentially Contaminated Soils". Water sample guidelines are derived from "AS/NZS 5667.1 : 1998 Water Quality - sampling part 1" and APHA "Standard Methods for the Examination of Water and Wastewater" 21st edition 2005.

Extraction and analysis holding time due dates listed are calculated from the date sampled, although holding times may be extended after laboratory extraction for some analytes. The due dates are the suggested dates that samples may be held before extraction or analysis and still be considered valid.

Extraction and analysis dates are shown in **Green** when within suggested criteria or **Red** with an appended dagger symbol (†) when outside suggested criteria. If the sampled date is not supplied then compliance with criteria cannot be determined. If the received date is after one or both due dates then holding time will fail by default.

Moisture Content (continued)

Method: ME-(AU)-[ENV]AN002

Sample Name	Sample No.	QC Ref	Sampled	Received	Extraction Due	Extracted	Analysis Due	Analysed
QC03	SE192028.037	LB172307	17 Apr 2019	24 Apr 2019	01 May 2019	26 Apr 2019	01 May 2019	29 Apr 2019
TB01	SE192028.039	LB172307	17 Apr 2019	24 Apr 2019	01 May 2019	26 Apr 2019	01 May 2019	29 Apr 2019

OC Pesticides in Soil

Method: ME-(AU)-[ENV]AN420

Sample Name	Sample No.	QC Ref	Sampled	Received	Extraction Due	Extracted	Analysis Due	Analysed
S01_0-0.1	SE192028.001	LB172299	17 Apr 2019	24 Apr 2019	01 May 2019	26 Apr 2019	05 Jun 2019	29 Apr 2019
S02_0-0.1	SE192028.002	LB172299	17 Apr 2019	24 Apr 2019	01 May 2019	26 Apr 2019	05 Jun 2019	29 Apr 2019
S02_0.4-0.5	SE192028.003	LB172299	17 Apr 2019	24 Apr 2019	01 May 2019	26 Apr 2019	05 Jun 2019	29 Apr 2019
S03_0-0.1	SE192028.004	LB172299	17 Apr 2019	24 Apr 2019	01 May 2019	26 Apr 2019	05 Jun 2019	29 Apr 2019
S04_0-0.1	SE192028.005	LB172299	17 Apr 2019	24 Apr 2019	01 May 2019	26 Apr 2019	05 Jun 2019	29 Apr 2019
S04_-0.4-0.5	SE192028.006	LB172299	17 Apr 2019	24 Apr 2019	01 May 2019	26 Apr 2019	05 Jun 2019	29 Apr 2019
S05_0-0.1	SE192028.007	LB172299	17 Apr 2019	24 Apr 2019	01 May 2019	26 Apr 2019	05 Jun 2019	29 Apr 2019
S05_0.4-0.5	SE192028.008	LB172299	17 Apr 2019	24 Apr 2019	01 May 2019	26 Apr 2019	05 Jun 2019	29 Apr 2019
S06_0-0.1	SE192028.009	LB172299	17 Apr 2019	24 Apr 2019	01 May 2019	26 Apr 2019	05 Jun 2019	29 Apr 2019
S06_0.4-0.5	SE192028.010	LB172299	17 Apr 2019	24 Apr 2019	01 May 2019	26 Apr 2019	05 Jun 2019	29 Apr 2019
S07_0-0.1	SE192028.011	LB172299	17 Apr 2019	24 Apr 2019	01 May 2019	26 Apr 2019	05 Jun 2019	29 Apr 2019
S08_0-0.1	SE192028.012	LB172299	17 Apr 2019	24 Apr 2019	01 May 2019	26 Apr 2019	05 Jun 2019	29 Apr 2019
S08_0.3-0.4	SE192028.013	LB172299	17 Apr 2019	24 Apr 2019	01 May 2019	26 Apr 2019	05 Jun 2019	29 Apr 2019
S09_0-0.1	SE192028.014	LB172299	17 Apr 2019	24 Apr 2019	01 May 2019	26 Apr 2019	05 Jun 2019	29 Apr 2019
S10_0-0.1	SE192028.015	LB172299	17 Apr 2019	24 Apr 2019	01 May 2019	26 Apr 2019	05 Jun 2019	29 Apr 2019
S11_0-0.1	SE192028.016	LB172299	17 Apr 2019	24 Apr 2019	01 May 2019	26 Apr 2019	05 Jun 2019	29 Apr 2019
S11_0.4-0.5	SE192028.017	LB172299	17 Apr 2019	24 Apr 2019	01 May 2019	26 Apr 2019	05 Jun 2019	29 Apr 2019
S12_0-0.1	SE192028.018	LB172299	17 Apr 2019	24 Apr 2019	01 May 2019	26 Apr 2019	05 Jun 2019	29 Apr 2019
S13_0-0.1	SE192028.019	LB172299	17 Apr 2019	24 Apr 2019	01 May 2019	26 Apr 2019	05 Jun 2019	29 Apr 2019
S14_0-0.1	SE192028.020	LB172299	17 Apr 2019	24 Apr 2019	01 May 2019	26 Apr 2019	05 Jun 2019	29 Apr 2019
S14_0.4-0.5	SE192028.021	LB172300	17 Apr 2019	24 Apr 2019	01 May 2019	26 Apr 2019	05 Jun 2019	29 Apr 2019
S15_0-0.1	SE192028.022	LB172300	17 Apr 2019	24 Apr 2019	01 May 2019	26 Apr 2019	05 Jun 2019	29 Apr 2019
S16_0-0.1	SE192028.023	LB172300	17 Apr 2019	24 Apr 2019	01 May 2019	26 Apr 2019	05 Jun 2019	29 Apr 2019
S17_0-0.1	SE192028.024	LB172300	17 Apr 2019	24 Apr 2019	01 May 2019	26 Apr 2019	05 Jun 2019	29 Apr 2019
S18_0-0.1	SE192028.025	LB172300	17 Apr 2019	24 Apr 2019	01 May 2019	26 Apr 2019	05 Jun 2019	29 Apr 2019
S19_0-0.1	SE192028.026	LB172300	17 Apr 2019	24 Apr 2019	01 May 2019	26 Apr 2019	05 Jun 2019	29 Apr 2019
S19_0.4-0.5	SE192028.027	LB172300	17 Apr 2019	24 Apr 2019	01 May 2019	26 Apr 2019	05 Jun 2019	29 Apr 2019
S20_0-0.1	SE192028.028	LB172300	17 Apr 2019	24 Apr 2019	01 May 2019	26 Apr 2019	05 Jun 2019	29 Apr 2019
S20_0.4-0.5	SE192028.029	LB172300	17 Apr 2019	24 Apr 2019	01 May 2019	26 Apr 2019	05 Jun 2019	29 Apr 2019
S21_0-0.1	SE192028.030	LB172300	17 Apr 2019	24 Apr 2019	01 May 2019	26 Apr 2019	05 Jun 2019	29 Apr 2019
S22_0-0.1	SE192028.031	LB172300	17 Apr 2019	24 Apr 2019	01 May 2019	26 Apr 2019	05 Jun 2019	29 Apr 2019
S23_0-0.1	SE192028.032	LB172300	17 Apr 2019	24 Apr 2019	01 May 2019	26 Apr 2019	05 Jun 2019	29 Apr 2019
S24_0-0.1	SE192028.033	LB172300	17 Apr 2019	24 Apr 2019	01 May 2019	26 Apr 2019	05 Jun 2019	29 Apr 2019
S25_0-0.2	SE192028.034	LB172300	17 Apr 2019	24 Apr 2019	01 May 2019	26 Apr 2019	05 Jun 2019	29 Apr 2019
S26_0-0.2	SE192028.035	LB172300	17 Apr 2019	24 Apr 2019	01 May 2019	26 Apr 2019	05 Jun 2019	29 Apr 2019
QC01	SE192028.036	LB172300	17 Apr 2019	24 Apr 2019	01 May 2019	26 Apr 2019	05 Jun 2019	29 Apr 2019
QC03	SE192028.037	LB172300	17 Apr 2019	24 Apr 2019	01 May 2019	26 Apr 2019	05 Jun 2019	29 Apr 2019

OC Pesticides in Water

Method: ME-(AU)-[ENV]AN420

Sample Name	Sample No.	QC Ref	Sampled	Received	Extraction Due	Extracted	Analysis Due	Analysed
Rinsate_170419	SE192028.041	LB172310	17 Apr 2019	24 Apr 2019	24 Apr 2019	26 Apr 2019†	05 Jun 2019	29 Apr 2019

OP Pesticides in Soil

Method: ME-(AU)-[ENV]AN420

Sample Name	Sample No.	QC Ref	Sampled	Received	Extraction Due	Extracted	Analysis Due	Analysed
S01_0-0.1	SE192028.001	LB172299	17 Apr 2019	24 Apr 2019	01 May 2019	26 Apr 2019	05 Jun 2019	30 Apr 2019
S02_0-0.1	SE192028.002	LB172299	17 Apr 2019	24 Apr 2019	01 May 2019	26 Apr 2019	05 Jun 2019	30 Apr 2019
S02_0.4-0.5	SE192028.003	LB172299	17 Apr 2019	24 Apr 2019	01 May 2019	26 Apr 2019	05 Jun 2019	30 Apr 2019
S03_0-0.1	SE192028.004	LB172299	17 Apr 2019	24 Apr 2019	01 May 2019	26 Apr 2019	05 Jun 2019	30 Apr 2019
S04_0-0.1	SE192028.005	LB172299	17 Apr 2019	24 Apr 2019	01 May 2019	26 Apr 2019	05 Jun 2019	30 Apr 2019
S04_-0.4-0.5	SE192028.006	LB172299	17 Apr 2019	24 Apr 2019	01 May 2019	26 Apr 2019	05 Jun 2019	30 Apr 2019
S05_0-0.1	SE192028.007	LB172299	17 Apr 2019	24 Apr 2019	01 May 2019	26 Apr 2019	05 Jun 2019	30 Apr 2019
S05_0.4-0.5	SE192028.008	LB172299	17 Apr 2019	24 Apr 2019	01 May 2019	26 Apr 2019	05 Jun 2019	30 Apr 2019
S06_0-0.1	SE192028.009	LB172299	17 Apr 2019	24 Apr 2019	01 May 2019	26 Apr 2019	05 Jun 2019	30 Apr 2019
S06_0.4-0.5	SE192028.010	LB172299	17 Apr 2019	24 Apr 2019	01 May 2019	26 Apr 2019	05 Jun 2019	30 Apr 2019
S07_0-0.1	SE192028.011	LB172299	17 Apr 2019	24 Apr 2019	01 May 2019	26 Apr 2019	05 Jun 2019	30 Apr 2019

SGS holding time criteria are drawn from current regulations and are highly dependent on sample container preservation as specified in the SGS “Field Sampling Guide for Containers and Holding Time” (ref: GU-(AU)-ENV.001). Soil samples guidelines are derived from NEPM "Schedule B(3) Guideline on Laboratory Analysis of Potentially Contaminated Soils". Water sample guidelines are derived from "AS/NZS 5667.1 : 1998 Water Quality - sampling part 1" and APHA "Standard Methods for the Examination of Water and Wastewater" 21st edition 2005.

Extraction and analysis holding time due dates listed are calculated from the date sampled, although holding times may be extended after laboratory extraction for some analytes. The due dates are the suggested dates that samples may be held before extraction or analysis and still be considered valid.

Extraction and analysis dates are shown in **Green** when within suggested criteria or **Red** with an appended dagger symbol (†) when outside suggested criteria. If the sampled date is not supplied then compliance with criteria cannot be determined. If the received date is after one or both due dates then holding time will fail by default.

OP Pesticides in Soil (continued)

Method: ME-(AU)-[ENV]AN420

Sample Name	Sample No.	QC Ref	Sampled	Received	Extraction Due	Extracted	Analysis Due	Analysed
S08_0-0.1	SE192028.012	LB172299	17 Apr 2019	24 Apr 2019	01 May 2019	26 Apr 2019	05 Jun 2019	30 Apr 2019
S08_0.3-0.4	SE192028.013	LB172299	17 Apr 2019	24 Apr 2019	01 May 2019	26 Apr 2019	05 Jun 2019	30 Apr 2019
S09_0-0.1	SE192028.014	LB172299	17 Apr 2019	24 Apr 2019	01 May 2019	26 Apr 2019	05 Jun 2019	30 Apr 2019
S10_0-0.1	SE192028.015	LB172299	17 Apr 2019	24 Apr 2019	01 May 2019	26 Apr 2019	05 Jun 2019	30 Apr 2019
S11_0-0.1	SE192028.016	LB172299	17 Apr 2019	24 Apr 2019	01 May 2019	26 Apr 2019	05 Jun 2019	30 Apr 2019
S11_0.4-0.5	SE192028.017	LB172299	17 Apr 2019	24 Apr 2019	01 May 2019	26 Apr 2019	05 Jun 2019	30 Apr 2019
S12_0-0.1	SE192028.018	LB172299	17 Apr 2019	24 Apr 2019	01 May 2019	26 Apr 2019	05 Jun 2019	30 Apr 2019
S13_0-0.1	SE192028.019	LB172299	17 Apr 2019	24 Apr 2019	01 May 2019	26 Apr 2019	05 Jun 2019	30 Apr 2019
S14_0-0.1	SE192028.020	LB172299	17 Apr 2019	24 Apr 2019	01 May 2019	26 Apr 2019	05 Jun 2019	30 Apr 2019
S14_0.4-0.5	SE192028.021	LB172300	17 Apr 2019	24 Apr 2019	01 May 2019	26 Apr 2019	05 Jun 2019	29 Apr 2019
S15_0-0.1	SE192028.022	LB172300	17 Apr 2019	24 Apr 2019	01 May 2019	26 Apr 2019	05 Jun 2019	29 Apr 2019
S16_0-0.1	SE192028.023	LB172300	17 Apr 2019	24 Apr 2019	01 May 2019	26 Apr 2019	05 Jun 2019	30 Apr 2019
S17_0-0.1	SE192028.024	LB172300	17 Apr 2019	24 Apr 2019	01 May 2019	26 Apr 2019	05 Jun 2019	30 Apr 2019
S18_0-0.1	SE192028.025	LB172300	17 Apr 2019	24 Apr 2019	01 May 2019	26 Apr 2019	05 Jun 2019	30 Apr 2019
S19_0-0.1	SE192028.026	LB172300	17 Apr 2019	24 Apr 2019	01 May 2019	26 Apr 2019	05 Jun 2019	30 Apr 2019
S19_0.4-0.5	SE192028.027	LB172300	17 Apr 2019	24 Apr 2019	01 May 2019	26 Apr 2019	05 Jun 2019	30 Apr 2019
S20_0-0.1	SE192028.028	LB172300	17 Apr 2019	24 Apr 2019	01 May 2019	26 Apr 2019	05 Jun 2019	30 Apr 2019
S20_0.4-0.5	SE192028.029	LB172300	17 Apr 2019	24 Apr 2019	01 May 2019	26 Apr 2019	05 Jun 2019	30 Apr 2019
S21_0-0.1	SE192028.030	LB172300	17 Apr 2019	24 Apr 2019	01 May 2019	26 Apr 2019	05 Jun 2019	30 Apr 2019
S22_0-0.1	SE192028.031	LB172300	17 Apr 2019	24 Apr 2019	01 May 2019	26 Apr 2019	05 Jun 2019	30 Apr 2019
S23_0-0.1	SE192028.032	LB172300	17 Apr 2019	24 Apr 2019	01 May 2019	26 Apr 2019	05 Jun 2019	30 Apr 2019
S24_0-0.1	SE192028.033	LB172300	17 Apr 2019	24 Apr 2019	01 May 2019	26 Apr 2019	05 Jun 2019	30 Apr 2019
S25_0-0.2	SE192028.034	LB172300	17 Apr 2019	24 Apr 2019	01 May 2019	26 Apr 2019	05 Jun 2019	30 Apr 2019
S26_0-0.2	SE192028.035	LB172300	17 Apr 2019	24 Apr 2019	01 May 2019	26 Apr 2019	05 Jun 2019	29 Apr 2019
QC01	SE192028.036	LB172300	17 Apr 2019	24 Apr 2019	01 May 2019	26 Apr 2019	05 Jun 2019	29 Apr 2019
QC03	SE192028.037	LB172300	17 Apr 2019	24 Apr 2019	01 May 2019	26 Apr 2019	05 Jun 2019	29 Apr 2019

OP Pesticides in Water

Method: ME-(AU)-[ENV]AN420

Sample Name	Sample No.	QC Ref	Sampled	Received	Extraction Due	Extracted	Analysis Due	Analysed
Rinsate_170419	SE192028.041	LB172310	17 Apr 2019	24 Apr 2019	24 Apr 2019	26 Apr 2019†	05 Jun 2019	29 Apr 2019

PAH (Polynuclear Aromatic Hydrocarbons) in Soil

Method: ME-(AU)-[ENV]AN420

Sample Name	Sample No.	QC Ref	Sampled	Received	Extraction Due	Extracted	Analysis Due	Analysed
S01_0-0.1	SE192028.001	LB172299	17 Apr 2019	24 Apr 2019	01 May 2019	26 Apr 2019	05 Jun 2019	30 Apr 2019
S02_0-0.1	SE192028.002	LB172299	17 Apr 2019	24 Apr 2019	01 May 2019	26 Apr 2019	05 Jun 2019	30 Apr 2019
S02_0.4-0.5	SE192028.003	LB172299	17 Apr 2019	24 Apr 2019	01 May 2019	26 Apr 2019	05 Jun 2019	30 Apr 2019
S03_0-0.1	SE192028.004	LB172299	17 Apr 2019	24 Apr 2019	01 May 2019	26 Apr 2019	05 Jun 2019	30 Apr 2019
S04_0-0.1	SE192028.005	LB172299	17 Apr 2019	24 Apr 2019	01 May 2019	26 Apr 2019	05 Jun 2019	30 Apr 2019
S04_-0.4-0.5	SE192028.006	LB172299	17 Apr 2019	24 Apr 2019	01 May 2019	26 Apr 2019	05 Jun 2019	30 Apr 2019
S05_0-0.1	SE192028.007	LB172299	17 Apr 2019	24 Apr 2019	01 May 2019	26 Apr 2019	05 Jun 2019	30 Apr 2019
S05_0.4-0.5	SE192028.008	LB172299	17 Apr 2019	24 Apr 2019	01 May 2019	26 Apr 2019	05 Jun 2019	30 Apr 2019
S06_0-0.1	SE192028.009	LB172299	17 Apr 2019	24 Apr 2019	01 May 2019	26 Apr 2019	05 Jun 2019	30 Apr 2019
S06_0.4-0.5	SE192028.010	LB172299	17 Apr 2019	24 Apr 2019	01 May 2019	26 Apr 2019	05 Jun 2019	30 Apr 2019
S07_0-0.1	SE192028.011	LB172299	17 Apr 2019	24 Apr 2019	01 May 2019	26 Apr 2019	05 Jun 2019	30 Apr 2019
S08_0-0.1	SE192028.012	LB172299	17 Apr 2019	24 Apr 2019	01 May 2019	26 Apr 2019	05 Jun 2019	30 Apr 2019
S08_0.3-0.4	SE192028.013	LB172299	17 Apr 2019	24 Apr 2019	01 May 2019	26 Apr 2019	05 Jun 2019	30 Apr 2019
S09_0-0.1	SE192028.014	LB172299	17 Apr 2019	24 Apr 2019	01 May 2019	26 Apr 2019	05 Jun 2019	30 Apr 2019
S10_0-0.1	SE192028.015	LB172299	17 Apr 2019	24 Apr 2019	01 May 2019	26 Apr 2019	05 Jun 2019	30 Apr 2019
S11_0-0.1	SE192028.016	LB172299	17 Apr 2019	24 Apr 2019	01 May 2019	26 Apr 2019	05 Jun 2019	30 Apr 2019
S11_0.4-0.5	SE192028.017	LB172299	17 Apr 2019	24 Apr 2019	01 May 2019	26 Apr 2019	05 Jun 2019	30 Apr 2019
S12_0-0.1	SE192028.018	LB172299	17 Apr 2019	24 Apr 2019	01 May 2019	26 Apr 2019	05 Jun 2019	30 Apr 2019
S13_0-0.1	SE192028.019	LB172299	17 Apr 2019	24 Apr 2019	01 May 2019	26 Apr 2019	05 Jun 2019	30 Apr 2019
S14_0-0.1	SE192028.020	LB172299	17 Apr 2019	24 Apr 2019	01 May 2019	26 Apr 2019	05 Jun 2019	30 Apr 2019
S14_0.4-0.5	SE192028.021	LB172300	17 Apr 2019	24 Apr 2019	01 May 2019	26 Apr 2019	05 Jun 2019	29 Apr 2019
S15_0-0.1	SE192028.022	LB172300	17 Apr 2019	24 Apr 2019	01 May 2019	26 Apr 2019	05 Jun 2019	29 Apr 2019
S16_0-0.1	SE192028.023	LB172300	17 Apr 2019	24 Apr 2019	01 May 2019	26 Apr 2019	05 Jun 2019	30 Apr 2019
S17_0-0.1	SE192028.024	LB172300	17 Apr 2019	24 Apr 2019	01 May 2019	26 Apr 2019	05 Jun 2019	30 Apr 2019
S18_0-0.1	SE192028.025	LB172300	17 Apr 2019	24 Apr 2019	01 May 2019	26 Apr 2019	05 Jun 2019	30 Apr 2019
S19_0-0.1	SE192028.026	LB172300	17 Apr 2019	24 Apr 2019	01 May 2019	26 Apr 2019	05 Jun 2019	30 Apr 2019
S19_0.4-0.5	SE192028.027	LB172300	17 Apr 2019	24 Apr 2019	01 May 2019	26 Apr 2019	05 Jun 2019	30 Apr 2019

SGS holding time criteria are drawn from current regulations and are highly dependent on sample container preservation as specified in the SGS "Field Sampling Guide for Containers and Holding Time" (ref: GU-(AU)-ENV.001). Soil samples guidelines are derived from NEPM "Schedule B(3) Guideline on Laboratory Analysis of Potentially Contaminated Soils". Water sample guidelines are derived from "AS/NZS 5667.1 : 1998 Water Quality - sampling part 1" and APHA "Standard Methods for the Examination of Water and Wastewater" 21st edition 2005.

Extraction and analysis holding time due dates listed are calculated from the date sampled, although holding times may be extended after laboratory extraction for some analytes. The due dates are the suggested dates that samples may be held before extraction or analysis and still be considered valid.

Extraction and analysis dates are shown in **Green** when within suggested criteria or **Red** with an appended dagger symbol (†) when outside suggested criteria. If the sampled date is not supplied then compliance with criteria cannot be determined. If the received date is after one or both due dates then holding time will fail by default.

PAH (Polynuclear Aromatic Hydrocarbons) in Soil (continued)

Method: ME-(AU)-[ENV]AN420

Sample Name	Sample No.	QC Ref	Sampled	Received	Extraction Due	Extracted	Analysis Due	Analysed
S20_0-0.1	SE192028.028	LB172300	17 Apr 2019	24 Apr 2019	01 May 2019	26 Apr 2019	05 Jun 2019	30 Apr 2019
S20_0.4-0.5	SE192028.029	LB172300	17 Apr 2019	24 Apr 2019	01 May 2019	26 Apr 2019	05 Jun 2019	30 Apr 2019
S21_0-0.1	SE192028.030	LB172300	17 Apr 2019	24 Apr 2019	01 May 2019	26 Apr 2019	05 Jun 2019	30 Apr 2019
S22_0-0.1	SE192028.031	LB172300	17 Apr 2019	24 Apr 2019	01 May 2019	26 Apr 2019	05 Jun 2019	30 Apr 2019
S23_0-0.1	SE192028.032	LB172300	17 Apr 2019	24 Apr 2019	01 May 2019	26 Apr 2019	05 Jun 2019	30 Apr 2019
S24_0-0.1	SE192028.033	LB172300	17 Apr 2019	24 Apr 2019	01 May 2019	26 Apr 2019	05 Jun 2019	30 Apr 2019
S25_0-0.2	SE192028.034	LB172300	17 Apr 2019	24 Apr 2019	01 May 2019	26 Apr 2019	05 Jun 2019	30 Apr 2019
S26_0-0.2	SE192028.035	LB172300	17 Apr 2019	24 Apr 2019	01 May 2019	26 Apr 2019	05 Jun 2019	29 Apr 2019
QC01	SE192028.036	LB172300	17 Apr 2019	24 Apr 2019	01 May 2019	26 Apr 2019	05 Jun 2019	29 Apr 2019
QC03	SE192028.037	LB172300	17 Apr 2019	24 Apr 2019	01 May 2019	26 Apr 2019	05 Jun 2019	29 Apr 2019

PAH (Polynuclear Aromatic Hydrocarbons) in Water

Method: ME-(AU)-[ENV]AN420

Sample Name	Sample No.	QC Ref	Sampled	Received	Extraction Due	Extracted	Analysis Due	Analysed
Rinsate_170419	SE192028.041	LB172310	17 Apr 2019	24 Apr 2019	24 Apr 2019	26 Apr 2019†	05 Jun 2019	29 Apr 2019

PCBs in Soil

Method: ME-(AU)-[ENV]AN420

Sample Name	Sample No.	QC Ref	Sampled	Received	Extraction Due	Extracted	Analysis Due	Analysed
S01_0-0.1	SE192028.001	LB172299	17 Apr 2019	24 Apr 2019	01 May 2019	26 Apr 2019	05 Jun 2019	29 Apr 2019
S02_0-0.1	SE192028.002	LB172299	17 Apr 2019	24 Apr 2019	01 May 2019	26 Apr 2019	05 Jun 2019	29 Apr 2019
S02_0.4-0.5	SE192028.003	LB172299	17 Apr 2019	24 Apr 2019	01 May 2019	26 Apr 2019	05 Jun 2019	29 Apr 2019
S03_0-0.1	SE192028.004	LB172299	17 Apr 2019	24 Apr 2019	01 May 2019	26 Apr 2019	05 Jun 2019	29 Apr 2019
S04_0-0.1	SE192028.005	LB172299	17 Apr 2019	24 Apr 2019	01 May 2019	26 Apr 2019	05 Jun 2019	29 Apr 2019
S04_-0.4-0.5	SE192028.006	LB172299	17 Apr 2019	24 Apr 2019	01 May 2019	26 Apr 2019	05 Jun 2019	29 Apr 2019
S05_0-0.1	SE192028.007	LB172299	17 Apr 2019	24 Apr 2019	01 May 2019	26 Apr 2019	05 Jun 2019	29 Apr 2019
S05_0.4-0.5	SE192028.008	LB172299	17 Apr 2019	24 Apr 2019	01 May 2019	26 Apr 2019	05 Jun 2019	29 Apr 2019
S06_0-0.1	SE192028.009	LB172299	17 Apr 2019	24 Apr 2019	01 May 2019	26 Apr 2019	05 Jun 2019	29 Apr 2019
S06_0.4-0.5	SE192028.010	LB172299	17 Apr 2019	24 Apr 2019	01 May 2019	26 Apr 2019	05 Jun 2019	29 Apr 2019
S07_0-0.1	SE192028.011	LB172299	17 Apr 2019	24 Apr 2019	01 May 2019	26 Apr 2019	05 Jun 2019	29 Apr 2019
S08_0-0.1	SE192028.012	LB172299	17 Apr 2019	24 Apr 2019	01 May 2019	26 Apr 2019	05 Jun 2019	29 Apr 2019
S08_0.3-0.4	SE192028.013	LB172299	17 Apr 2019	24 Apr 2019	01 May 2019	26 Apr 2019	05 Jun 2019	29 Apr 2019
S09_0-0.1	SE192028.014	LB172299	17 Apr 2019	24 Apr 2019	01 May 2019	26 Apr 2019	05 Jun 2019	29 Apr 2019
S10_0-0.1	SE192028.015	LB172299	17 Apr 2019	24 Apr 2019	01 May 2019	26 Apr 2019	05 Jun 2019	29 Apr 2019
S11_0-0.1	SE192028.016	LB172299	17 Apr 2019	24 Apr 2019	01 May 2019	26 Apr 2019	05 Jun 2019	29 Apr 2019
S11_0.4-0.5	SE192028.017	LB172299	17 Apr 2019	24 Apr 2019	01 May 2019	26 Apr 2019	05 Jun 2019	29 Apr 2019
S12_0-0.1	SE192028.018	LB172299	17 Apr 2019	24 Apr 2019	01 May 2019	26 Apr 2019	05 Jun 2019	29 Apr 2019
S13_0-0.1	SE192028.019	LB172299	17 Apr 2019	24 Apr 2019	01 May 2019	26 Apr 2019	05 Jun 2019	29 Apr 2019
S14_0-0.1	SE192028.020	LB172299	17 Apr 2019	24 Apr 2019	01 May 2019	26 Apr 2019	05 Jun 2019	29 Apr 2019
S14_0.4-0.5	SE192028.021	LB172300	17 Apr 2019	24 Apr 2019	01 May 2019	26 Apr 2019	05 Jun 2019	29 Apr 2019
S15_0-0.1	SE192028.022	LB172300	17 Apr 2019	24 Apr 2019	01 May 2019	26 Apr 2019	05 Jun 2019	29 Apr 2019
S16_0-0.1	SE192028.023	LB172300	17 Apr 2019	24 Apr 2019	01 May 2019	26 Apr 2019	05 Jun 2019	29 Apr 2019
S17_0-0.1	SE192028.024	LB172300	17 Apr 2019	24 Apr 2019	01 May 2019	26 Apr 2019	05 Jun 2019	29 Apr 2019
S18_0-0.1	SE192028.025	LB172300	17 Apr 2019	24 Apr 2019	01 May 2019	26 Apr 2019	05 Jun 2019	29 Apr 2019
S19_0-0.1	SE192028.026	LB172300	17 Apr 2019	24 Apr 2019	01 May 2019	26 Apr 2019	05 Jun 2019	29 Apr 2019
S19_0.4-0.5	SE192028.027	LB172300	17 Apr 2019	24 Apr 2019	01 May 2019	26 Apr 2019	05 Jun 2019	29 Apr 2019
S20_0-0.1	SE192028.028	LB172300	17 Apr 2019	24 Apr 2019	01 May 2019	26 Apr 2019	05 Jun 2019	29 Apr 2019
S20_0.4-0.5	SE192028.029	LB172300	17 Apr 2019	24 Apr 2019	01 May 2019	26 Apr 2019	05 Jun 2019	29 Apr 2019
S21_0-0.1	SE192028.030	LB172300	17 Apr 2019	24 Apr 2019	01 May 2019	26 Apr 2019	05 Jun 2019	29 Apr 2019
S22_0-0.1	SE192028.031	LB172300	17 Apr 2019	24 Apr 2019	01 May 2019	26 Apr 2019	05 Jun 2019	29 Apr 2019
S23_0-0.1	SE192028.032	LB172300	17 Apr 2019	24 Apr 2019	01 May 2019	26 Apr 2019	05 Jun 2019	29 Apr 2019
S24_0-0.1	SE192028.033	LB172300	17 Apr 2019	24 Apr 2019	01 May 2019	26 Apr 2019	05 Jun 2019	29 Apr 2019
S25_0-0.2	SE192028.034	LB172300	17 Apr 2019	24 Apr 2019	01 May 2019	26 Apr 2019	05 Jun 2019	29 Apr 2019
S26_0-0.2	SE192028.035	LB172300	17 Apr 2019	24 Apr 2019	01 May 2019	26 Apr 2019	05 Jun 2019	29 Apr 2019
QC01	SE192028.036	LB172300	17 Apr 2019	24 Apr 2019	01 May 2019	26 Apr 2019	05 Jun 2019	29 Apr 2019
QC03	SE192028.037	LB172300	17 Apr 2019	24 Apr 2019	01 May 2019	26 Apr 2019	05 Jun 2019	29 Apr 2019

PCBs in Water

Method: ME-(AU)-[ENV]AN420

Sample Name	Sample No.	QC Ref	Sampled	Received	Extraction Due	Extracted	Analysis Due	Analysed
Rinsate_170419	SE192028.041	LB172310	17 Apr 2019	24 Apr 2019	24 Apr 2019	26 Apr 2019†	05 Jun 2019	29 Apr 2019

SGS holding time criteria are drawn from current regulations and are highly dependent on sample container preservation as specified in the SGS “Field Sampling Guide for Containers and Holding Time” (ref: GU-(AU)-ENV.001). Soil samples guidelines are derived from NEPM "Schedule B(3) Guideline on Laboratory Analysis of Potentially Contaminated Soils". Water sample guidelines are derived from "AS/NZS 5667.1 : 1998 Water Quality - sampling part 1" and APHA "Standard Methods for the Examination of Water and Wastewater" 21st edition 2005.

Extraction and analysis holding time due dates listed are calculated from the date sampled, although holding times may be extended after laboratory extraction for some analytes. The due dates are the suggested dates that samples may be held before extraction or analysis and still be considered valid.

Extraction and analysis dates are shown in **Green** when within suggested criteria or **Red** with an appended dagger symbol (†) when outside suggested criteria. If the sampled date is not supplied then compliance with criteria cannot be determined. If the received date is after one or both due dates then holding time will fail by default.

Total Recoverable Elements in Soil/Waste Solids/Materials by ICPOES

Method: ME-(AU)-[ENV]AN040/AN320

Sample Name	Sample No.	QC Ref	Sampled	Received	Extraction Due	Extracted	Analysis Due	Analysed
S01_0-0.1	SE192028.001	LB172303	17 Apr 2019	24 Apr 2019	14 Oct 2019	26 Apr 2019	14 Oct 2019	29 Apr 2019
S02_0-0.1	SE192028.002	LB172303	17 Apr 2019	24 Apr 2019	14 Oct 2019	26 Apr 2019	14 Oct 2019	29 Apr 2019
S02_0.4-0.5	SE192028.003	LB172303	17 Apr 2019	24 Apr 2019	14 Oct 2019	26 Apr 2019	14 Oct 2019	29 Apr 2019
S03_0-0.1	SE192028.004	LB172303	17 Apr 2019	24 Apr 2019	14 Oct 2019	26 Apr 2019	14 Oct 2019	29 Apr 2019
S04_0-0.1	SE192028.005	LB172303	17 Apr 2019	24 Apr 2019	14 Oct 2019	26 Apr 2019	14 Oct 2019	29 Apr 2019
S04_-0.4-0.5	SE192028.006	LB172303	17 Apr 2019	24 Apr 2019	14 Oct 2019	26 Apr 2019	14 Oct 2019	29 Apr 2019
S05_0-0.1	SE192028.007	LB172303	17 Apr 2019	24 Apr 2019	14 Oct 2019	26 Apr 2019	14 Oct 2019	29 Apr 2019
S05_0.4-0.5	SE192028.008	LB172303	17 Apr 2019	24 Apr 2019	14 Oct 2019	26 Apr 2019	14 Oct 2019	29 Apr 2019
S06_0-0.1	SE192028.009	LB172303	17 Apr 2019	24 Apr 2019	14 Oct 2019	26 Apr 2019	14 Oct 2019	29 Apr 2019
S06_0.4-0.5	SE192028.010	LB172303	17 Apr 2019	24 Apr 2019	14 Oct 2019	26 Apr 2019	14 Oct 2019	29 Apr 2019
S07_0-0.1	SE192028.011	LB172303	17 Apr 2019	24 Apr 2019	14 Oct 2019	26 Apr 2019	14 Oct 2019	29 Apr 2019
S08_0-0.1	SE192028.012	LB172303	17 Apr 2019	24 Apr 2019	14 Oct 2019	26 Apr 2019	14 Oct 2019	29 Apr 2019
S08_0.3-0.4	SE192028.013	LB172303	17 Apr 2019	24 Apr 2019	14 Oct 2019	26 Apr 2019	14 Oct 2019	29 Apr 2019
S09_0-0.1	SE192028.014	LB172303	17 Apr 2019	24 Apr 2019	14 Oct 2019	26 Apr 2019	14 Oct 2019	29 Apr 2019
S10_0-0.1	SE192028.015	LB172303	17 Apr 2019	24 Apr 2019	14 Oct 2019	26 Apr 2019	14 Oct 2019	29 Apr 2019
S11_0-0.1	SE192028.016	LB172303	17 Apr 2019	24 Apr 2019	14 Oct 2019	26 Apr 2019	14 Oct 2019	29 Apr 2019
S11_0.4-0.5	SE192028.017	LB172303	17 Apr 2019	24 Apr 2019	14 Oct 2019	26 Apr 2019	14 Oct 2019	29 Apr 2019
S12_0-0.1	SE192028.018	LB172303	17 Apr 2019	24 Apr 2019	14 Oct 2019	26 Apr 2019	14 Oct 2019	29 Apr 2019
S13_0-0.1	SE192028.019	LB172303	17 Apr 2019	24 Apr 2019	14 Oct 2019	26 Apr 2019	14 Oct 2019	29 Apr 2019
S14_0-0.1	SE192028.020	LB172304	17 Apr 2019	24 Apr 2019	14 Oct 2019	26 Apr 2019	14 Oct 2019	29 Apr 2019
S14_0.4-0.5	SE192028.021	LB172304	17 Apr 2019	24 Apr 2019	14 Oct 2019	26 Apr 2019	14 Oct 2019	29 Apr 2019
S15_0-0.1	SE192028.022	LB172304	17 Apr 2019	24 Apr 2019	14 Oct 2019	26 Apr 2019	14 Oct 2019	29 Apr 2019
S16_0-0.1	SE192028.023	LB172304	17 Apr 2019	24 Apr 2019	14 Oct 2019	26 Apr 2019	14 Oct 2019	29 Apr 2019
S17_0-0.1	SE192028.024	LB172304	17 Apr 2019	24 Apr 2019	14 Oct 2019	26 Apr 2019	14 Oct 2019	29 Apr 2019
S18_0-0.1	SE192028.025	LB172304	17 Apr 2019	24 Apr 2019	14 Oct 2019	26 Apr 2019	14 Oct 2019	29 Apr 2019
S19_0-0.1	SE192028.026	LB172304	17 Apr 2019	24 Apr 2019	14 Oct 2019	26 Apr 2019	14 Oct 2019	29 Apr 2019
S19_0.4-0.5	SE192028.027	LB172304	17 Apr 2019	24 Apr 2019	14 Oct 2019	26 Apr 2019	14 Oct 2019	29 Apr 2019
S20_0-0.1	SE192028.028	LB172304	17 Apr 2019	24 Apr 2019	14 Oct 2019	26 Apr 2019	14 Oct 2019	29 Apr 2019
S20_0.4-0.5	SE192028.029	LB172304	17 Apr 2019	24 Apr 2019	14 Oct 2019	26 Apr 2019	14 Oct 2019	29 Apr 2019
S21_0-0.1	SE192028.030	LB172304	17 Apr 2019	24 Apr 2019	14 Oct 2019	26 Apr 2019	14 Oct 2019	29 Apr 2019
S22_0-0.1	SE192028.031	LB172304	17 Apr 2019	24 Apr 2019	14 Oct 2019	26 Apr 2019	14 Oct 2019	29 Apr 2019
S23_0-0.1	SE192028.032	LB172304	17 Apr 2019	24 Apr 2019	14 Oct 2019	26 Apr 2019	14 Oct 2019	29 Apr 2019
S24_0-0.1	SE192028.033	LB172304	17 Apr 2019	24 Apr 2019	14 Oct 2019	26 Apr 2019	14 Oct 2019	29 Apr 2019
S25_0-0.2	SE192028.034	LB172304	17 Apr 2019	24 Apr 2019	14 Oct 2019	26 Apr 2019	14 Oct 2019	29 Apr 2019
S26_0-0.2	SE192028.035	LB172304	17 Apr 2019	24 Apr 2019	14 Oct 2019	26 Apr 2019	14 Oct 2019	29 Apr 2019
QC01	SE192028.036	LB172304	17 Apr 2019	24 Apr 2019	14 Oct 2019	26 Apr 2019	14 Oct 2019	29 Apr 2019
QC03	SE192028.037	LB172304	17 Apr 2019	24 Apr 2019	14 Oct 2019	26 Apr 2019	14 Oct 2019	29 Apr 2019

Trace Metals (Dissolved) in Water by ICPMS

Method: ME-(AU)-[ENV]AN318

Sample Name	Sample No.	QC Ref	Sampled	Received	Extraction Due	Extracted	Analysis Due	Analysed
Rinsate_170419	SE192028.041	LB172364	17 Apr 2019	24 Apr 2019	14 Oct 2019	29 Apr 2019	14 Oct 2019	29 Apr 2019

TRH (Total Recoverable Hydrocarbons) in Soil

Method: ME-(AU)-[ENV]AN403

Sample Name	Sample No.	QC Ref	Sampled	Received	Extraction Due	Extracted	Analysis Due	Analysed
S01_0-0.1	SE192028.001	LB172299	17 Apr 2019	24 Apr 2019	01 May 2019	26 Apr 2019	05 Jun 2019	29 Apr 2019
S02_0-0.1	SE192028.002	LB172299	17 Apr 2019	24 Apr 2019	01 May 2019	26 Apr 2019	05 Jun 2019	29 Apr 2019
S02_0.4-0.5	SE192028.003	LB172299	17 Apr 2019	24 Apr 2019	01 May 2019	26 Apr 2019	05 Jun 2019	29 Apr 2019
S03_0-0.1	SE192028.004	LB172299	17 Apr 2019	24 Apr 2019	01 May 2019	26 Apr 2019	05 Jun 2019	29 Apr 2019
S04_0-0.1	SE192028.005	LB172299	17 Apr 2019	24 Apr 2019	01 May 2019	26 Apr 2019	05 Jun 2019	29 Apr 2019
S04_-0.4-0.5	SE192028.006	LB172299	17 Apr 2019	24 Apr 2019	01 May 2019	26 Apr 2019	05 Jun 2019	29 Apr 2019
S05_0-0.1	SE192028.007	LB172299	17 Apr 2019	24 Apr 2019	01 May 2019	26 Apr 2019	05 Jun 2019	29 Apr 2019
S05_0.4-0.5	SE192028.008	LB172299	17 Apr 2019	24 Apr 2019	01 May 2019	26 Apr 2019	05 Jun 2019	29 Apr 2019
S06_0-0.1	SE192028.009	LB172299	17 Apr 2019	24 Apr 2019	01 May 2019	26 Apr 2019	05 Jun 2019	29 Apr 2019
S06_0.4-0.5	SE192028.010	LB172299	17 Apr 2019	24 Apr 2019	01 May 2019	26 Apr 2019	05 Jun 2019	29 Apr 2019
S07_0-0.1	SE192028.011	LB172299	17 Apr 2019	24 Apr 2019	01 May 2019	26 Apr 2019	05 Jun 2019	29 Apr 2019
S08_0-0.1	SE192028.012	LB172299	17 Apr 2019	24 Apr 2019	01 May 2019	26 Apr 2019	05 Jun 2019	29 Apr 2019
S08_0.3-0.4	SE192028.013	LB172299	17 Apr 2019	24 Apr 2019	01 May 2019	26 Apr 2019	05 Jun 2019	29 Apr 2019
S09_0-0.1	SE192028.014	LB172299	17 Apr 2019	24 Apr 2019	01 May 2019	26 Apr 2019	05 Jun 2019	29 Apr 2019
S10_0-0.1	SE192028.015	LB172299	17 Apr 2019	24 Apr 2019	01 May 2019	26 Apr 2019	05 Jun 2019	29 Apr 2019
S11_0-0.1	SE192028.016	LB172299	17 Apr 2019	24 Apr 2019	01 May 2019	26 Apr 2019	05 Jun 2019	29 Apr 2019

SGS holding time criteria are drawn from current regulations and are highly dependent on sample container preservation as specified in the SGS “Field Sampling Guide for Containers and Holding Time” (ref: GU-(AU)-ENV.001). Soil samples guidelines are derived from NEPM "Schedule B(3) Guideline on Laboratory Analysis of Potentially Contaminated Soils". Water sample guidelines are derived from "AS/NZS 5667.1 : 1998 Water Quality - sampling part 1" and APHA "Standard Methods for the Examination of Water and Wastewater" 21st edition 2005.

Extraction and analysis holding time due dates listed are calculated from the date sampled, although holding times may be extended after laboratory extraction for some analytes. The due dates are the suggested dates that samples may be held before extraction or analysis and still be considered valid.

Extraction and analysis dates are shown in **Green** when within suggested criteria or **Red** with an appended dagger symbol (†) when outside suggested criteria. If the sampled date is not supplied then compliance with criteria cannot be determined. If the received date is after one or both due dates then holding time will fail by default.

TRH (Total Recoverable Hydrocarbons) in Soil (continued)

Method: ME-(AU)-[ENV]AN403

Sample Name	Sample No.	QC Ref	Sampled	Received	Extraction Due	Extracted	Analysis Due	Analysed
S11_0.4-0.5	SE192028.017	LB172299	17 Apr 2019	24 Apr 2019	01 May 2019	26 Apr 2019	05 Jun 2019	29 Apr 2019
S12_0-0.1	SE192028.018	LB172299	17 Apr 2019	24 Apr 2019	01 May 2019	26 Apr 2019	05 Jun 2019	29 Apr 2019
S13_0-0.1	SE192028.019	LB172299	17 Apr 2019	24 Apr 2019	01 May 2019	26 Apr 2019	05 Jun 2019	29 Apr 2019
S14_0-0.1	SE192028.020	LB172299	17 Apr 2019	24 Apr 2019	01 May 2019	26 Apr 2019	05 Jun 2019	29 Apr 2019
S14_0.4-0.5	SE192028.021	LB172300	17 Apr 2019	24 Apr 2019	01 May 2019	26 Apr 2019	05 Jun 2019	29 Apr 2019
S15_0-0.1	SE192028.022	LB172300	17 Apr 2019	24 Apr 2019	01 May 2019	26 Apr 2019	05 Jun 2019	29 Apr 2019
S16_0-0.1	SE192028.023	LB172300	17 Apr 2019	24 Apr 2019	01 May 2019	26 Apr 2019	05 Jun 2019	29 Apr 2019
S17_0-0.1	SE192028.024	LB172300	17 Apr 2019	24 Apr 2019	01 May 2019	26 Apr 2019	05 Jun 2019	29 Apr 2019
S18_0-0.1	SE192028.025	LB172300	17 Apr 2019	24 Apr 2019	01 May 2019	26 Apr 2019	05 Jun 2019	29 Apr 2019
S19_0-0.1	SE192028.026	LB172300	17 Apr 2019	24 Apr 2019	01 May 2019	26 Apr 2019	05 Jun 2019	29 Apr 2019
S19_0.4-0.5	SE192028.027	LB172300	17 Apr 2019	24 Apr 2019	01 May 2019	26 Apr 2019	05 Jun 2019	29 Apr 2019
S20_0-0.1	SE192028.028	LB172300	17 Apr 2019	24 Apr 2019	01 May 2019	26 Apr 2019	05 Jun 2019	29 Apr 2019
S20_0.4-0.5	SE192028.029	LB172300	17 Apr 2019	24 Apr 2019	01 May 2019	26 Apr 2019	05 Jun 2019	29 Apr 2019
S21_0-0.1	SE192028.030	LB172300	17 Apr 2019	24 Apr 2019	01 May 2019	26 Apr 2019	05 Jun 2019	29 Apr 2019
S22_0-0.1	SE192028.031	LB172300	17 Apr 2019	24 Apr 2019	01 May 2019	26 Apr 2019	05 Jun 2019	29 Apr 2019
S23_0-0.1	SE192028.032	LB172300	17 Apr 2019	24 Apr 2019	01 May 2019	26 Apr 2019	05 Jun 2019	29 Apr 2019
S24_0-0.1	SE192028.033	LB172300	17 Apr 2019	24 Apr 2019	01 May 2019	26 Apr 2019	05 Jun 2019	29 Apr 2019
S25_0-0.2	SE192028.034	LB172300	17 Apr 2019	24 Apr 2019	01 May 2019	26 Apr 2019	05 Jun 2019	29 Apr 2019
S26_0-0.2	SE192028.035	LB172300	17 Apr 2019	24 Apr 2019	01 May 2019	26 Apr 2019	05 Jun 2019	29 Apr 2019
QC01	SE192028.036	LB172300	17 Apr 2019	24 Apr 2019	01 May 2019	26 Apr 2019	05 Jun 2019	29 Apr 2019
QC03	SE192028.037	LB172300	17 Apr 2019	24 Apr 2019	01 May 2019	26 Apr 2019	05 Jun 2019	29 Apr 2019

TRH (Total Recoverable Hydrocarbons) in Water

Method: ME-(AU)-[ENV]AN403

Sample Name	Sample No.	QC Ref	Sampled	Received	Extraction Due	Extracted	Analysis Due	Analysed
Rinsate_170419	SE192028.041	LB172310	17 Apr 2019	24 Apr 2019	24 Apr 2019	26 Apr 2019†	05 Jun 2019	29 Apr 2019

VOC's in Soil

Method: ME-(AU)-[ENV]AN433

Sample Name	Sample No.	QC Ref	Sampled	Received	Extraction Due	Extracted	Analysis Due	Analysed
S01_0-0.1	SE192028.001	LB172297	17 Apr 2019	24 Apr 2019	01 May 2019	26 Apr 2019	05 Jun 2019	29 Apr 2019
S02_0-0.1	SE192028.002	LB172297	17 Apr 2019	24 Apr 2019	01 May 2019	26 Apr 2019	05 Jun 2019	29 Apr 2019
S02_0.4-0.5	SE192028.003	LB172297	17 Apr 2019	24 Apr 2019	01 May 2019	26 Apr 2019	05 Jun 2019	29 Apr 2019
S03_0-0.1	SE192028.004	LB172297	17 Apr 2019	24 Apr 2019	01 May 2019	26 Apr 2019	05 Jun 2019	29 Apr 2019
S04_0-0.1	SE192028.005	LB172297	17 Apr 2019	24 Apr 2019	01 May 2019	26 Apr 2019	05 Jun 2019	29 Apr 2019
S04_-0.4-0.5	SE192028.006	LB172297	17 Apr 2019	24 Apr 2019	01 May 2019	26 Apr 2019	05 Jun 2019	29 Apr 2019
S05_0-0.1	SE192028.007	LB172297	17 Apr 2019	24 Apr 2019	01 May 2019	26 Apr 2019	05 Jun 2019	29 Apr 2019
S05_0.4-0.5	SE192028.008	LB172297	17 Apr 2019	24 Apr 2019	01 May 2019	26 Apr 2019	05 Jun 2019	29 Apr 2019
S06_0-0.1	SE192028.009	LB172297	17 Apr 2019	24 Apr 2019	01 May 2019	26 Apr 2019	05 Jun 2019	29 Apr 2019
S06_0.4-0.5	SE192028.010	LB172297	17 Apr 2019	24 Apr 2019	01 May 2019	26 Apr 2019	05 Jun 2019	29 Apr 2019
S07_0-0.1	SE192028.011	LB172297	17 Apr 2019	24 Apr 2019	01 May 2019	26 Apr 2019	05 Jun 2019	29 Apr 2019
S08_0-0.1	SE192028.012	LB172297	17 Apr 2019	24 Apr 2019	01 May 2019	26 Apr 2019	05 Jun 2019	29 Apr 2019
S08_0.3-0.4	SE192028.013	LB172297	17 Apr 2019	24 Apr 2019	01 May 2019	26 Apr 2019	05 Jun 2019	29 Apr 2019
S09_0-0.1	SE192028.014	LB172297	17 Apr 2019	24 Apr 2019	01 May 2019	26 Apr 2019	05 Jun 2019	29 Apr 2019
S10_0-0.1	SE192028.015	LB172297	17 Apr 2019	24 Apr 2019	01 May 2019	26 Apr 2019	05 Jun 2019	29 Apr 2019
S11_0-0.1	SE192028.016	LB172297	17 Apr 2019	24 Apr 2019	01 May 2019	26 Apr 2019	05 Jun 2019	29 Apr 2019
S11_0.4-0.5	SE192028.017	LB172297	17 Apr 2019	24 Apr 2019	01 May 2019	26 Apr 2019	05 Jun 2019	29 Apr 2019
S12_0-0.1	SE192028.018	LB172297	17 Apr 2019	24 Apr 2019	01 May 2019	26 Apr 2019	05 Jun 2019	29 Apr 2019
S13_0-0.1	SE192028.019	LB172297	17 Apr 2019	24 Apr 2019	01 May 2019	26 Apr 2019	05 Jun 2019	29 Apr 2019
S14_0-0.1	SE192028.020	LB172297	17 Apr 2019	24 Apr 2019	01 May 2019	26 Apr 2019	05 Jun 2019	29 Apr 2019
S14_0.4-0.5	SE192028.021	LB172298	17 Apr 2019	24 Apr 2019	01 May 2019	26 Apr 2019	05 Jun 2019	29 Apr 2019
S15_0-0.1	SE192028.022	LB172298	17 Apr 2019	24 Apr 2019	01 May 2019	26 Apr 2019	05 Jun 2019	29 Apr 2019
S16_0-0.1	SE192028.023	LB172298	17 Apr 2019	24 Apr 2019	01 May 2019	26 Apr 2019	05 Jun 2019	29 Apr 2019
S17_0-0.1	SE192028.024	LB172298	17 Apr 2019	24 Apr 2019	01 May 2019	26 Apr 2019	05 Jun 2019	29 Apr 2019
S18_0-0.1	SE192028.025	LB172298	17 Apr 2019	24 Apr 2019	01 May 2019	26 Apr 2019	05 Jun 2019	29 Apr 2019
S19_0-0.1	SE192028.026	LB172298	17 Apr 2019	24 Apr 2019	01 May 2019	26 Apr 2019	05 Jun 2019	29 Apr 2019
S19_0.4-0.5	SE192028.027	LB172298	17 Apr 2019	24 Apr 2019	01 May 2019	26 Apr 2019	05 Jun 2019	29 Apr 2019
S20_0-0.1	SE192028.028	LB172298	17 Apr 2019	24 Apr 2019	01 May 2019	26 Apr 2019	05 Jun 2019	29 Apr 2019
S20_0.4-0.5	SE192028.029	LB172298	17 Apr 2019	24 Apr 2019	01 May 2019	26 Apr 2019	05 Jun 2019	29 Apr 2019
S21_0-0.1	SE192028.030	LB172298	17 Apr 2019	24 Apr 2019	01 May 2019	26 Apr 2019	05 Jun 2019	29 Apr 2019
S22_0-0.1	SE192028.031	LB172298	17 Apr 2019	24 Apr 2019	01 May 2019	26 Apr 2019	05 Jun 2019	29 Apr 2019
S23_0-0.1	SE192028.032	LB172298	17 Apr 2019	24 Apr 2019	01 May 2019	26 Apr 2019	05 Jun 2019	29 Apr 2019

SGS holding time criteria are drawn from current regulations and are highly dependent on sample container preservation as specified in the SGS “Field Sampling Guide for Containers and Holding Time” (ref: GU-(AU)-ENV.001). Soil samples guidelines are derived from NEPM "Schedule B(3) Guideline on Laboratory Analysis of Potentially Contaminated Soils". Water sample guidelines are derived from "AS/NZS 5667.1 : 1998 Water Quality - sampling part 1" and APHA "Standard Methods for the Examination of Water and Wastewater" 21st edition 2005.

Extraction and analysis holding time due dates listed are calculated from the date sampled, although holding times may be extended after laboratory extraction for some analytes. The due dates are the suggested dates that samples may be held before extraction or analysis and still be considered valid.

Extraction and analysis dates are shown in **Green** when within suggested criteria or **Red** with an appended dagger symbol (†) when outside suggested criteria. If the sampled date is not supplied then compliance with criteria cannot be determined. If the received date is after one or both due dates then holding time will fail by default.

VOC's in Soil (continued)

Method: ME-(AU)-[ENV]AN433

Sample Name	Sample No.	QC Ref	Sampled	Received	Extraction Due	Extracted	Analysis Due	Analysed
S24_0-0.1	SE192028.033	LB172298	17 Apr 2019	24 Apr 2019	01 May 2019	26 Apr 2019	05 Jun 2019	29 Apr 2019
S25_0-0.2	SE192028.034	LB172298	17 Apr 2019	24 Apr 2019	01 May 2019	26 Apr 2019	05 Jun 2019	29 Apr 2019
S26_0-0.2	SE192028.035	LB172298	17 Apr 2019	24 Apr 2019	01 May 2019	26 Apr 2019	05 Jun 2019	29 Apr 2019
QC01	SE192028.036	LB172298	17 Apr 2019	24 Apr 2019	01 May 2019	26 Apr 2019	05 Jun 2019	29 Apr 2019
QC03	SE192028.037	LB172298	17 Apr 2019	24 Apr 2019	01 May 2019	26 Apr 2019	05 Jun 2019	29 Apr 2019
TB01	SE192028.039	LB172298	17 Apr 2019	24 Apr 2019	01 May 2019	26 Apr 2019	05 Jun 2019	29 Apr 2019
TS01	SE192028.040	LB172298	17 Apr 2019	24 Apr 2019	01 May 2019	26 Apr 2019	05 Jun 2019	29 Apr 2019

VOCs in Water

Method: ME-(AU)-[ENV]AN433

Sample Name	Sample No.	QC Ref	Sampled	Received	Extraction Due	Extracted	Analysis Due	Analysed
FB01	SE192028.038	LB172301	17 Apr 2019	24 Apr 2019	24 Apr 2019	26 Apr 2019†	05 Jun 2019	29 Apr 2019
Rinsate_170419	SE192028.041	LB172301	17 Apr 2019	24 Apr 2019	24 Apr 2019	26 Apr 2019†	05 Jun 2019	29 Apr 2019

Volatile Petroleum Hydrocarbons in Soil

Method: ME-(AU)-[ENV]AN433

Sample Name	Sample No.	QC Ref	Sampled	Received	Extraction Due	Extracted	Analysis Due	Analysed
S01_0-0.1	SE192028.001	LB172297	17 Apr 2019	24 Apr 2019	01 May 2019	26 Apr 2019	05 Jun 2019	29 Apr 2019
S02_0-0.1	SE192028.002	LB172297	17 Apr 2019	24 Apr 2019	01 May 2019	26 Apr 2019	05 Jun 2019	29 Apr 2019
S02_0.4-0.5	SE192028.003	LB172297	17 Apr 2019	24 Apr 2019	01 May 2019	26 Apr 2019	05 Jun 2019	29 Apr 2019
S03_0-0.1	SE192028.004	LB172297	17 Apr 2019	24 Apr 2019	01 May 2019	26 Apr 2019	05 Jun 2019	29 Apr 2019
S04_0-0.1	SE192028.005	LB172297	17 Apr 2019	24 Apr 2019	01 May 2019	26 Apr 2019	05 Jun 2019	29 Apr 2019
S04_-0.4-0.5	SE192028.006	LB172297	17 Apr 2019	24 Apr 2019	01 May 2019	26 Apr 2019	05 Jun 2019	29 Apr 2019
S05_0-0.1	SE192028.007	LB172297	17 Apr 2019	24 Apr 2019	01 May 2019	26 Apr 2019	05 Jun 2019	29 Apr 2019
S05_0.4-0.5	SE192028.008	LB172297	17 Apr 2019	24 Apr 2019	01 May 2019	26 Apr 2019	05 Jun 2019	29 Apr 2019
S06_0-0.1	SE192028.009	LB172297	17 Apr 2019	24 Apr 2019	01 May 2019	26 Apr 2019	05 Jun 2019	29 Apr 2019
S06_0.4-0.5	SE192028.010	LB172297	17 Apr 2019	24 Apr 2019	01 May 2019	26 Apr 2019	05 Jun 2019	29 Apr 2019
S07_0-0.1	SE192028.011	LB172297	17 Apr 2019	24 Apr 2019	01 May 2019	26 Apr 2019	05 Jun 2019	29 Apr 2019
S08_0-0.1	SE192028.012	LB172297	17 Apr 2019	24 Apr 2019	01 May 2019	26 Apr 2019	05 Jun 2019	29 Apr 2019
S08_0.3-0.4	SE192028.013	LB172297	17 Apr 2019	24 Apr 2019	01 May 2019	26 Apr 2019	05 Jun 2019	29 Apr 2019
S09_0-0.1	SE192028.014	LB172297	17 Apr 2019	24 Apr 2019	01 May 2019	26 Apr 2019	05 Jun 2019	29 Apr 2019
S10_0-0.1	SE192028.015	LB172297	17 Apr 2019	24 Apr 2019	01 May 2019	26 Apr 2019	05 Jun 2019	29 Apr 2019
S11_0-0.1	SE192028.016	LB172297	17 Apr 2019	24 Apr 2019	01 May 2019	26 Apr 2019	05 Jun 2019	29 Apr 2019
S11_0.4-0.5	SE192028.017	LB172297	17 Apr 2019	24 Apr 2019	01 May 2019	26 Apr 2019	05 Jun 2019	29 Apr 2019
S12_0-0.1	SE192028.018	LB172297	17 Apr 2019	24 Apr 2019	01 May 2019	26 Apr 2019	05 Jun 2019	29 Apr 2019
S13_0-0.1	SE192028.019	LB172297	17 Apr 2019	24 Apr 2019	01 May 2019	26 Apr 2019	05 Jun 2019	29 Apr 2019
S14_0-0.1	SE192028.020	LB172297	17 Apr 2019	24 Apr 2019	01 May 2019	26 Apr 2019	05 Jun 2019	29 Apr 2019
S14_0.4-0.5	SE192028.021	LB172298	17 Apr 2019	24 Apr 2019	01 May 2019	26 Apr 2019	05 Jun 2019	29 Apr 2019
S15_0-0.1	SE192028.022	LB172298	17 Apr 2019	24 Apr 2019	01 May 2019	26 Apr 2019	05 Jun 2019	29 Apr 2019
S16_0-0.1	SE192028.023	LB172298	17 Apr 2019	24 Apr 2019	01 May 2019	26 Apr 2019	05 Jun 2019	29 Apr 2019
S17_0-0.1	SE192028.024	LB172298	17 Apr 2019	24 Apr 2019	01 May 2019	26 Apr 2019	05 Jun 2019	29 Apr 2019
S18_0-0.1	SE192028.025	LB172298	17 Apr 2019	24 Apr 2019	01 May 2019	26 Apr 2019	05 Jun 2019	29 Apr 2019
S19_0-0.1	SE192028.026	LB172298	17 Apr 2019	24 Apr 2019	01 May 2019	26 Apr 2019	05 Jun 2019	29 Apr 2019
S19_0.4-0.5	SE192028.027	LB172298	17 Apr 2019	24 Apr 2019	01 May 2019	26 Apr 2019	05 Jun 2019	29 Apr 2019
S20_0-0.1	SE192028.028	LB172298	17 Apr 2019	24 Apr 2019	01 May 2019	26 Apr 2019	05 Jun 2019	29 Apr 2019
S20_0.4-0.5	SE192028.029	LB172298	17 Apr 2019	24 Apr 2019	01 May 2019	26 Apr 2019	05 Jun 2019	29 Apr 2019
S21_0-0.1	SE192028.030	LB172298	17 Apr 2019	24 Apr 2019	01 May 2019	26 Apr 2019	05 Jun 2019	29 Apr 2019
S22_0-0.1	SE192028.031	LB172298	17 Apr 2019	24 Apr 2019	01 May 2019	26 Apr 2019	05 Jun 2019	29 Apr 2019
S23_0-0.1	SE192028.032	LB172298	17 Apr 2019	24 Apr 2019	01 May 2019	26 Apr 2019	05 Jun 2019	29 Apr 2019
S24_0-0.1	SE192028.033	LB172298	17 Apr 2019	24 Apr 2019	01 May 2019	26 Apr 2019	05 Jun 2019	29 Apr 2019
S25_0-0.2	SE192028.034	LB172298	17 Apr 2019	24 Apr 2019	01 May 2019	26 Apr 2019	05 Jun 2019	29 Apr 2019
S26_0-0.2	SE192028.035	LB172298	17 Apr 2019	24 Apr 2019	01 May 2019	26 Apr 2019	05 Jun 2019	29 Apr 2019
QC01	SE192028.036	LB172298	17 Apr 2019	24 Apr 2019	01 May 2019	26 Apr 2019	05 Jun 2019	29 Apr 2019
QC03	SE192028.037	LB172298	17 Apr 2019	24 Apr 2019	01 May 2019	26 Apr 2019	05 Jun 2019	29 Apr 2019
TB01	SE192028.039	LB172298	17 Apr 2019	24 Apr 2019	01 May 2019	26 Apr 2019	05 Jun 2019	29 Apr 2019
TS01	SE192028.040	LB172298	17 Apr 2019	24 Apr 2019	01 May 2019	26 Apr 2019	05 Jun 2019	29 Apr 2019

Volatile Petroleum Hydrocarbons in Water

Method: ME-(AU)-[ENV]AN433

Sample Name	Sample No.	QC Ref	Sampled	Received	Extraction Due	Extracted	Analysis Due	Analysed
FB01	SE192028.038	LB172301	17 Apr 2019	24 Apr 2019	24 Apr 2019	26 Apr 2019†	05 Jun 2019	29 Apr 2019
Rinsate_170419	SE192028.041	LB172301	17 Apr 2019	24 Apr 2019	24 Apr 2019	26 Apr 2019†	05 Jun 2019	29 Apr 2019

Surrogate results are evaluated against upper and lower limit criteria established in the SGS QA/QC plan (Ref: MP-(AU)-[ENV]QU-022). At least two of three routine level soil sample surrogate spike recoveries for BTEX/VOC are to be within 70-130% where control charts have not been developed and within the established control limits for charted surrogates. Matrix effects may void this as an acceptance criterion. Water sample surrogate spike recoveries are to be within 40-130%. The presence of emulsions, surfactants and particulates may void this as an acceptance criterion.

Result is shown in **Green** when within suggested criteria or **Red** with an appended reason identifer when outside suggested criteria. Refer to the footnotes section at the end of this report for failure reasons.

OC Pesticides in Soil

Method: ME-(AU)-[ENV]AN420

Parameter	Sample Name	Sample Number	Units	Criteria	Recovery %
Tetrachloro-m-xylene (TCMX) (Surrogate)	S02_0-0.1	SE192028.002	%	60 - 130%	97
	S02_0.4-0.5	SE192028.003	%	60 - 130%	121
	S05_0-0.1	SE192028.007	%	60 - 130%	103
	S05_0.4-0.5	SE192028.008	%	60 - 130%	126
	S07_0-0.1	SE192028.011	%	60 - 130%	109
	S08_0-0.1	SE192028.012	%	60 - 130%	113
	S08_0.3-0.4	SE192028.013	%	60 - 130%	113
	S11_0-0.1	SE192028.016	%	60 - 130%	118
	S11_0.4-0.5	SE192028.017	%	60 - 130%	115
	S12_0-0.1	SE192028.018	%	60 - 130%	105
	S14_0-0.1	SE192028.020	%	60 - 130%	112
	S14_0.4-0.5	SE192028.021	%	60 - 130%	103
	S15_0-0.1	SE192028.022	%	60 - 130%	97
	S16_0-0.1	SE192028.023	%	60 - 130%	97
	S18_0-0.1	SE192028.025	%	60 - 130%	97
	S19_0-0.1	SE192028.026	%	60 - 130%	95
	S19_0.4-0.5	SE192028.027	%	60 - 130%	96
	S20_0-0.1	SE192028.028	%	60 - 130%	97
	S20_0.4-0.5	SE192028.029	%	60 - 130%	99
	S23_0-0.1	SE192028.032	%	60 - 130%	99
	S24_0-0.1	SE192028.033	%	60 - 130%	97
	S25_0-0.2	SE192028.034	%	60 - 130%	95
	S26_0-0.2	SE192028.035	%	60 - 130%	85
	QC01	SE192028.036	%	60 - 130%	105
	QC03	SE192028.037	%	60 - 130%	95

OC Pesticides in Water

Method: ME-(AU)-[ENV]AN420

Parameter	Sample Name	Sample Number	Units	Criteria	Recovery %
Tetrachloro-m-xylene (TCMX) (Surrogate)	Rinsate_170419	SE192028.041	%	40 - 130%	75

OP Pesticides in Soil

Method: ME-(AU)-[ENV]AN420

Parameter	Sample Name	Sample Number	Units	Criteria	Recovery %
2-fluorobiphenyl (Surrogate)	S02_0-0.1	SE192028.002	%	60 - 130%	92
	S02_0.4-0.5	SE192028.003	%	60 - 130%	92
	S05_0-0.1	SE192028.007	%	60 - 130%	98
	S05_0.4-0.5	SE192028.008	%	60 - 130%	96
	S07_0-0.1	SE192028.011	%	60 - 130%	92
	S08_0-0.1	SE192028.012	%	60 - 130%	92
	S08_0.3-0.4	SE192028.013	%	60 - 130%	92
	S11_0-0.1	SE192028.016	%	60 - 130%	96
	S11_0.4-0.5	SE192028.017	%	60 - 130%	86
	S12_0-0.1	SE192028.018	%	60 - 130%	98
	S14_0-0.1	SE192028.020	%	60 - 130%	90
	S14_0.4-0.5	SE192028.021	%	60 - 130%	90
	S15_0-0.1	SE192028.022	%	60 - 130%	96
	S16_0-0.1	SE192028.023	%	60 - 130%	92
	S18_0-0.1	SE192028.025	%	60 - 130%	102
	S19_0-0.1	SE192028.026	%	60 - 130%	96
	S19_0.4-0.5	SE192028.027	%	60 - 130%	80
	S20_0-0.1	SE192028.028	%	60 - 130%	92
	S20_0.4-0.5	SE192028.029	%	60 - 130%	92
	S23_0-0.1	SE192028.032	%	60 - 130%	90
	S24_0-0.1	SE192028.033	%	60 - 130%	92
	S25_0-0.2	SE192028.034	%	60 - 130%	92
	S26_0-0.2	SE192028.035	%	60 - 130%	100
	QC01	SE192028.036	%	60 - 130%	110
	QC03	SE192028.037	%	60 - 130%	102
d14-p-terphenyl (Surrogate)	S02_0-0.1	SE192028.002	%	60 - 130%	96
	S02_0.4-0.5	SE192028.003	%	60 - 130%	100
	S05_0-0.1	SE192028.007	%	60 - 130%	100

Surrogate results are evaluated against upper and lower limit criteria established in the SGS QA/QC plan (Ref: MP-(AU)-[ENV]QU-022). At least two of three routine level soil sample surrogate spike recoveries for BTEX/VOC are to be within 70-130% where control charts have not been developed and within the established control limits for charted surrogates. Matrix effects may void this as an acceptance criterion. Water sample surrogate spike recoveries are to be within 40-130%. The presence of emulsions, surfactants and particulates may void this as an acceptance criterion.

Result is shown in **Green** when within suggested criteria or **Red** with an appended reason identifer when outside suggested criteria. Refer to the footnotes section at the end of this report for failure reasons.

OP Pesticides in Soil (continued)

Method: ME-(AU)-[ENV]AN420

Parameter	Sample Name	Sample Number	Units	Criteria	Recovery %
d14-p-terphenyl (Surrogate)	S05_0.4-0.5	SE192028.008	%	60 - 130%	104
	S07_0-0.1	SE192028.011	%	60 - 130%	98
	S08_0-0.1	SE192028.012	%	60 - 130%	98
	S08_0.3-0.4	SE192028.013	%	60 - 130%	98
	S11_0-0.1	SE192028.016	%	60 - 130%	100
	S11_0.4-0.5	SE192028.017	%	60 - 130%	90
	S12_0-0.1	SE192028.018	%	60 - 130%	108
	S14_0-0.1	SE192028.020	%	60 - 130%	94
	S14_0.4-0.5	SE192028.021	%	60 - 130%	102
	S15_0-0.1	SE192028.022	%	60 - 130%	104
	S16_0-0.1	SE192028.023	%	60 - 130%	106
	S18_0-0.1	SE192028.025	%	60 - 130%	114
	S19_0-0.1	SE192028.026	%	60 - 130%	106
	S19_0.4-0.5	SE192028.027	%	60 - 130%	92
	S20_0-0.1	SE192028.028	%	60 - 130%	102
	S20_0.4-0.5	SE192028.029	%	60 - 130%	102
	S23_0-0.1	SE192028.032	%	60 - 130%	106
	S24_0-0.1	SE192028.033	%	60 - 130%	102
	S25_0-0.2	SE192028.034	%	60 - 130%	104
	S26_0-0.2	SE192028.035	%	60 - 130%	100
	QC01	SE192028.036	%	60 - 130%	112
	QC03	SE192028.037	%	60 - 130%	110

OP Pesticides in Water

Method: ME-(AU)-[ENV]AN420

Parameter	Sample Name	Sample Number	Units	Criteria	Recovery %
2-fluorobiphenyl (Surrogate)	Rinsate_170419	SE192028.041	%	40 - 130%	56
d14-p-terphenyl (Surrogate)	Rinsate_170419	SE192028.041	%	40 - 130%	70

PAH (Polynuclear Aromatic Hydrocarbons) in Soil

Method: ME-(AU)-[ENV]AN420

Parameter	Sample Name	Sample Number	Units	Criteria	Recovery %
2-fluorobiphenyl (Surrogate)	S02_0-0.1	SE192028.002	%	70 - 130%	92
	S02_0.4-0.5	SE192028.003	%	70 - 130%	92
	S05_0-0.1	SE192028.007	%	70 - 130%	98
	S05_0.4-0.5	SE192028.008	%	70 - 130%	96
	S07_0-0.1	SE192028.011	%	70 - 130%	92
	S08_0-0.1	SE192028.012	%	70 - 130%	92
	S08_0.3-0.4	SE192028.013	%	70 - 130%	92
	S11_0-0.1	SE192028.016	%	70 - 130%	96
	S11_0.4-0.5	SE192028.017	%	70 - 130%	86
	S12_0-0.1	SE192028.018	%	70 - 130%	98
	S14_0-0.1	SE192028.020	%	70 - 130%	90
	S14_0.4-0.5	SE192028.021	%	70 - 130%	90
	S15_0-0.1	SE192028.022	%	70 - 130%	96
	S16_0-0.1	SE192028.023	%	70 - 130%	92
	S18_0-0.1	SE192028.025	%	70 - 130%	102
	S19_0-0.1	SE192028.026	%	70 - 130%	96
	S19_0.4-0.5	SE192028.027	%	70 - 130%	80
	S20_0-0.1	SE192028.028	%	70 - 130%	92
	S20_0.4-0.5	SE192028.029	%	70 - 130%	92
	S23_0-0.1	SE192028.032	%	70 - 130%	90
	S24_0-0.1	SE192028.033	%	70 - 130%	92
	S25_0-0.2	SE192028.034	%	70 - 130%	92
	S26_0-0.2	SE192028.035	%	70 - 130%	100
	QC01	SE192028.036	%	70 - 130%	110
	QC03	SE192028.037	%	70 - 130%	102
d14-p-terphenyl (Surrogate)	S02_0-0.1	SE192028.002	%	70 - 130%	96
	S02_0.4-0.5	SE192028.003	%	70 - 130%	100
	S05_0-0.1	SE192028.007	%	70 - 130%	100
	S05_0.4-0.5	SE192028.008	%	70 - 130%	104
	S07_0-0.1	SE192028.011	%	70 - 130%	98
	S08_0-0.1	SE192028.012	%	70 - 130%	98

Surrogate results are evaluated against upper and lower limit criteria established in the SGS QA/QC plan (Ref: MP-(AU)-[ENV]QU-022). At least two of three routine level soil sample surrogate spike recoveries for BTEX/VOC are to be within 70-130% where control charts have not been developed and within the established control limits for charted surrogates. Matrix effects may void this as an acceptance criterion. Water sample surrogate spike recoveries are to be within 40-130%. The presence of emulsions, surfactants and particulates may void this as an acceptance criterion.

Result is shown in **Green** when within suggested criteria or **Red** with an appended reason identifer when outside suggested criteria. Refer to the footnotes section at the end of this report for failure reasons.

PAH (Polynuclear Aromatic Hydrocarbons) in Soil (continued)

Method: ME-(AU)-[ENV]AN420

Parameter	Sample Name	Sample Number	Units	Criteria	Recovery %
d14-p-terphenyl (Surrogate)	S08_0.3-0.4	SE192028.013	%	70 - 130%	98
	S11_0-0.1	SE192028.016	%	70 - 130%	100
	S11_0.4-0.5	SE192028.017	%	70 - 130%	90
	S12_0-0.1	SE192028.018	%	70 - 130%	108
	S14_0-0.1	SE192028.020	%	70 - 130%	94
	S14_0.4-0.5	SE192028.021	%	70 - 130%	102
	S15_0-0.1	SE192028.022	%	70 - 130%	104
	S16_0-0.1	SE192028.023	%	70 - 130%	106
	S18_0-0.1	SE192028.025	%	70 - 130%	114
	S19_0-0.1	SE192028.026	%	70 - 130%	106
	S19_0.4-0.5	SE192028.027	%	70 - 130%	92
	S20_0-0.1	SE192028.028	%	70 - 130%	102
	S20_0.4-0.5	SE192028.029	%	70 - 130%	102
	S23_0-0.1	SE192028.032	%	70 - 130%	106
	S24_0-0.1	SE192028.033	%	70 - 130%	102
	S25_0-0.2	SE192028.034	%	70 - 130%	104
	S26_0-0.2	SE192028.035	%	70 - 130%	100
	QC01	SE192028.036	%	70 - 130%	112
	QC03	SE192028.037	%	70 - 130%	110
d5-nitrobenzene (Surrogate)	S02_0-0.1	SE192028.002	%	70 - 130%	98
	S02_0.4-0.5	SE192028.003	%	70 - 130%	98
	S05_0-0.1	SE192028.007	%	70 - 130%	100
	S05_0.4-0.5	SE192028.008	%	70 - 130%	102
	S07_0-0.1	SE192028.011	%	70 - 130%	98
	S08_0-0.1	SE192028.012	%	70 - 130%	96
	S08_0.3-0.4	SE192028.013	%	70 - 130%	96
	S11_0-0.1	SE192028.016	%	70 - 130%	98
	S11_0.4-0.5	SE192028.017	%	70 - 130%	86
	S12_0-0.1	SE192028.018	%	70 - 130%	100
	S14_0-0.1	SE192028.020	%	70 - 130%	94
	S14_0.4-0.5	SE192028.021	%	70 - 130%	102
	S15_0-0.1	SE192028.022	%	70 - 130%	96
	S16_0-0.1	SE192028.023	%	70 - 130%	98
	S18_0-0.1	SE192028.025	%	70 - 130%	106
	S19_0-0.1	SE192028.026	%	70 - 130%	102
	S19_0.4-0.5	SE192028.027	%	70 - 130%	86
	S20_0-0.1	SE192028.028	%	70 - 130%	100
	S20_0.4-0.5	SE192028.029	%	70 - 130%	102
	S23_0-0.1	SE192028.032	%	70 - 130%	100
	S24_0-0.1	SE192028.033	%	70 - 130%	102
	S25_0-0.2	SE192028.034	%	70 - 130%	104
	S26_0-0.2	SE192028.035	%	70 - 130%	96
	QC01	SE192028.036	%	70 - 130%	108
	QC03	SE192028.037	%	70 - 130%	108

PAH (Polynuclear Aromatic Hydrocarbons) in Water

Method: ME-(AU)-[ENV]AN420

Parameter	Sample Name	Sample Number	Units	Criteria	Recovery %
2-fluorobiphenyl (Surrogate)	Rinsate_170419	SE192028.041	%	40 - 130%	56
d14-p-terphenyl (Surrogate)	Rinsate_170419	SE192028.041	%	40 - 130%	70
d5-nitrobenzene (Surrogate)	Rinsate_170419	SE192028.041	%	40 - 130%	52

PCBs in Soil

Method: ME-(AU)-[ENV]AN420

Parameter	Sample Name	Sample Number	Units	Criteria	Recovery %
Tetrachloro-m-xylene (TCMX) (Surrogate)	S02_0-0.1	SE192028.002	%	60 - 130%	97
	S02_0.4-0.5	SE192028.003	%	60 - 130%	121
	S05_0-0.1	SE192028.007	%	60 - 130%	103
	S05_0.4-0.5	SE192028.008	%	60 - 130%	126
	S07_0-0.1	SE192028.011	%	60 - 130%	109
	S08_0-0.1	SE192028.012	%	60 - 130%	113
	S08_0.3-0.4	SE192028.013	%	60 - 130%	113
	S11_0-0.1	SE192028.016	%	60 - 130%	118
	S11_0.4-0.5	SE192028.017	%	60 - 130%	115

Surrogate results are evaluated against upper and lower limit criteria established in the SGS QA /QC plan (Ref: MP-(AU)-[ENV]QU-022). At least two of three routine level soil sample surrogate spike recoveries for BTEX/VOC are to be within 70-130% where control charts have not been developed and within the established control limits for charted surrogates. Matrix effects may void this as an acceptance criterion. Water sample surrogate spike recoveries are to be within 40-130%. The presence of emulsions, surfactants and particulates may void this as an acceptance criterion.

Result is shown in **Green** when within suggested criteria or **Red** with an appended reason identifer when outside suggested criteria. Refer to the footnotes section at the end of this report for failure reasons.

PCBs in Soil (continued)

Method: ME-(AU)-[ENV]AN420

Parameter	Sample Name	Sample Number	Units	Criteria	Recovery %
Tetrachloro-m-xylene (TCMX) (Surrogate)	S12_0-0.1	SE192028.018	%	60 - 130%	105
	S14_0-0.1	SE192028.020	%	60 - 130%	112
	S14_0.4-0.5	SE192028.021	%	60 - 130%	103
	S15_0-0.1	SE192028.022	%	60 - 130%	97
	S16_0-0.1	SE192028.023	%	60 - 130%	97
	S18_0-0.1	SE192028.025	%	60 - 130%	97
	S19_0-0.1	SE192028.026	%	60 - 130%	95
	S19_0.4-0.5	SE192028.027	%	60 - 130%	96
	S20_0-0.1	SE192028.028	%	60 - 130%	97
	S20_0.4-0.5	SE192028.029	%	60 - 130%	99
	S23_0-0.1	SE192028.032	%	60 - 130%	99
	S24_0-0.1	SE192028.033	%	60 - 130%	97
	S25_0-0.2	SE192028.034	%	60 - 130%	95
	S26_0-0.2	SE192028.035	%	60 - 130%	85
	QC01	SE192028.036	%	60 - 130%	105
	QC03	SE192028.037	%	60 - 130%	95

PCBs in Water

Method: ME-(AU)-[ENV]AN420

Parameter	Sample Name	Sample Number	Units	Criteria	Recovery %
Tetrachloro-m-xylene (Surrogate)	Rinsate_170419	SE192028.041	%	40 - 130%	75

VOC's in Soil

Method: ME-(AU)-[ENV]AN433

Parameter	Sample Name	Sample Number	Units	Criteria	Recovery %
Bromofluorobenzene (Surrogate)	S01_0-0.1	SE192028.001	%	60 - 130%	79
	S02_0-0.1	SE192028.002	%	60 - 130%	85
	S02_0.4-0.5	SE192028.003	%	60 - 130%	79
	S03_0-0.1	SE192028.004	%	60 - 130%	93
	S04_0-0.1	SE192028.005	%	60 - 130%	81
	S04_-0.4-0.5	SE192028.006	%	60 - 130%	77
	S05_0-0.1	SE192028.007	%	60 - 130%	78
	S05_0.4-0.5	SE192028.008	%	60 - 130%	74
	S06_0-0.1	SE192028.009	%	60 - 130%	71
	S06_0.4-0.5	SE192028.010	%	60 - 130%	77
	S07_0-0.1	SE192028.011	%	60 - 130%	74
	S08_0-0.1	SE192028.012	%	60 - 130%	79
	S08_0.3-0.4	SE192028.013	%	60 - 130%	77
	S09_0-0.1	SE192028.014	%	60 - 130%	76
	S10_0-0.1	SE192028.015	%	60 - 130%	76
	S11_0-0.1	SE192028.016	%	60 - 130%	72
	S11_0.4-0.5	SE192028.017	%	60 - 130%	77
	S12_0-0.1	SE192028.018	%	60 - 130%	75
	S13_0-0.1	SE192028.019	%	60 - 130%	75
	S14_0-0.1	SE192028.020	%	60 - 130%	78
	S14_0.4-0.5	SE192028.021	%	60 - 130%	79
	S15_0-0.1	SE192028.022	%	60 - 130%	78
	S16_0-0.1	SE192028.023	%	60 - 130%	71
	S17_0-0.1	SE192028.024	%	60 - 130%	74
	S18_0-0.1	SE192028.025	%	60 - 130%	77
	S19_0-0.1	SE192028.026	%	60 - 130%	74
	S19_0.4-0.5	SE192028.027	%	60 - 130%	74
	S20_0-0.1	SE192028.028	%	60 - 130%	71
	S20_0.4-0.5	SE192028.029	%	60 - 130%	75
	S21_0-0.1	SE192028.030	%	60 - 130%	73
	S22_0-0.1	SE192028.031	%	60 - 130%	76
	S23_0-0.1	SE192028.032	%	60 - 130%	80
	S24_0-0.1	SE192028.033	%	60 - 130%	77
	S25_0-0.2	SE192028.034	%	60 - 130%	77
	S26_0-0.2	SE192028.035	%	60 - 130%	77
	QC01	SE192028.036	%	60 - 130%	78
	QC03	SE192028.037	%	60 - 130%	75

Surrogate results are evaluated against upper and lower limit criteria established in the SGS QA/QC plan (Ref: MP-(AU)-[ENV]QU-022). At least two of three routine level soil sample surrogate spike recoveries for BTEX/VOC are to be within 70-130% where control charts have not been developed and within the established control limits for charted surrogates. Matrix effects may void this as an acceptance criterion. Water sample surrogate spike recoveries are to be within 40-130%. The presence of emulsions, surfactants and particulates may void this as an acceptance criterion.

Result is shown in **Green** when within suggested criteria or **Red** with an appended reason identifer when outside suggested criteria. Refer to the footnotes section at the end of this report for failure reasons.

VOC's in Soil (continued) **Method: ME-(AU)-[ENV]AN433**

Parameter	Sample Name	Sample Number	Units	Criteria	Recovery %
Bromofluorobenzene (Surrogate)	TB01	SE192028.039	%	60 - 130%	77
	TS01	SE192028.040	%	60 - 130%	72
d4-1,2-dichloroethane (Surrogate)	S01_0-0.1	SE192028.001	%	60 - 130%	107
	S02_0-0.1	SE192028.002	%	60 - 130%	116
	S02_0.4-0.5	SE192028.003	%	60 - 130%	85
	S03_0-0.1	SE192028.004	%	60 - 130%	121
	S04_0-0.1	SE192028.005	%	60 - 130%	102
	S04_-0.4-0.5	SE192028.006	%	60 - 130%	108
	S05_0-0.1	SE192028.007	%	60 - 130%	92
	S05_0.4-0.5	SE192028.008	%	60 - 130%	99
	S06_0-0.1	SE192028.009	%	60 - 130%	79
	S06_0.4-0.5	SE192028.010	%	60 - 130%	106
	S07_0-0.1	SE192028.011	%	60 - 130%	98
	S08_0-0.1	SE192028.012	%	60 - 130%	109
	S08_0.3-0.4	SE192028.013	%	60 - 130%	110
	S09_0-0.1	SE192028.014	%	60 - 130%	107
	S10_0-0.1	SE192028.015	%	60 - 130%	107
	S11_0-0.1	SE192028.016	%	60 - 130%	105
	S11_0.4-0.5	SE192028.017	%	60 - 130%	108
	S12_0-0.1	SE192028.018	%	60 - 130%	100
	S13_0-0.1	SE192028.019	%	60 - 130%	98
	S14_0-0.1	SE192028.020	%	60 - 130%	88
	S14_0.4-0.5	SE192028.021	%	60 - 130%	76
	S15_0-0.1	SE192028.022	%	60 - 130%	78
	S16_0-0.1	SE192028.023	%	60 - 130%	73
	S17_0-0.1	SE192028.024	%	60 - 130%	76
	S18_0-0.1	SE192028.025	%	60 - 130%	79
	S19_0-0.1	SE192028.026	%	60 - 130%	78
	S19_0.4-0.5	SE192028.027	%	60 - 130%	74
	S20_0-0.1	SE192028.028	%	60 - 130%	70
	S20_0.4-0.5	SE192028.029	%	60 - 130%	74
	S21_0-0.1	SE192028.030	%	60 - 130%	75
	S22_0-0.1	SE192028.031	%	60 - 130%	72
	S23_0-0.1	SE192028.032	%	60 - 130%	77
	S24_0-0.1	SE192028.033	%	60 - 130%	72
	S25_0-0.2	SE192028.034	%	60 - 130%	74
	S26_0-0.2	SE192028.035	%	60 - 130%	74
	QC01	SE192028.036	%	60 - 130%	75
	QC03	SE192028.037	%	60 - 130%	80
	TB01	SE192028.039	%	60 - 130%	79
	TS01	SE192028.040	%	60 - 130%	76
d8-toluene (Surrogate)	S01_0-0.1	SE192028.001	%	60 - 130%	78
	S02_0-0.1	SE192028.002	%	60 - 130%	85
	S02_0.4-0.5	SE192028.003	%	60 - 130%	79
	S03_0-0.1	SE192028.004	%	60 - 130%	94
	S04_0-0.1	SE192028.005	%	60 - 130%	81
	S04_-0.4-0.5	SE192028.006	%	60 - 130%	77
	S05_0-0.1	SE192028.007	%	60 - 130%	74
	S05_0.4-0.5	SE192028.008	%	60 - 130%	73
	S06_0-0.1	SE192028.009	%	60 - 130%	72
	S06_0.4-0.5	SE192028.010	%	60 - 130%	77
	S07_0-0.1	SE192028.011	%	60 - 130%	75
	S08_0-0.1	SE192028.012	%	60 - 130%	79
	S08_0.3-0.4	SE192028.013	%	60 - 130%	77
	S09_0-0.1	SE192028.014	%	60 - 130%	78
	S10_0-0.1	SE192028.015	%	60 - 130%	76
	S11_0-0.1	SE192028.016	%	60 - 130%	74
	S11_0.4-0.5	SE192028.017	%	60 - 130%	78
	S12_0-0.1	SE192028.018	%	60 - 130%	71
	S13_0-0.1	SE192028.019	%	60 - 130%	70
	S14_0-0.1	SE192028.020	%	60 - 130%	77

Surrogate results are evaluated against upper and lower limit criteria established in the SGS QA /QC plan (Ref: MP-(AU)-[ENV]QU-022). At least two of three routine level soil sample surrogate spike recoveries for BTEX/VOC are to be within 70-130% where control charts have not been developed and within the established control limits for charted surrogates. Matrix effects may void this as an acceptance criterion. Water sample surrogate spike recoveries are to be within 40-130%. The presence of emulsions, surfactants and particulates may void this as an acceptance criterion.

Result is shown in **Green** when within suggested criteria or **Red** with an appended reason identifer when outside suggested criteria. Refer to the footnotes section at the end of this report for failure reasons.

VOC's in Soil (continued)

Method: ME-(AU)-[ENV]AN433

Parameter	Sample Name	Sample Number	Units	Criteria	Recovery %
d8-toluene (Surrogate)	S14_0.4-0.5	SE192028.021	%	60 - 130%	79
	S15_0-0.1	SE192028.022	%	60 - 130%	72
	S16_0-0.1	SE192028.023	%	60 - 130%	75
	S17_0-0.1	SE192028.024	%	60 - 130%	79
	S18_0-0.1	SE192028.025	%	60 - 130%	71
	S19_0-0.1	SE192028.026	%	60 - 130%	73
	S19_0.4-0.5	SE192028.027	%	60 - 130%	79
	S20_0-0.1	SE192028.028	%	60 - 130%	71
	S20_0.4-0.5	SE192028.029	%	60 - 130%	77
	S21_0-0.1	SE192028.030	%	60 - 130%	77
	S22_0-0.1	SE192028.031	%	60 - 130%	82
	S23_0-0.1	SE192028.032	%	60 - 130%	79
	S24_0-0.1	SE192028.033	%	60 - 130%	88
	S25_0-0.2	SE192028.034	%	60 - 130%	79
	S26_0-0.2	SE192028.035	%	60 - 130%	76
	QC01	SE192028.036	%	60 - 130%	77
	QC03	SE192028.037	%	60 - 130%	75
	TB01	SE192028.039	%	60 - 130%	76
	TS01	SE192028.040	%	60 - 130%	84
Dibromofluoromethane (Surrogate)	S01_0-0.1	SE192028.001	%	60 - 130%	105
	S02_0-0.1	SE192028.002	%	60 - 130%	112
	S02_0.4-0.5	SE192028.003	%	60 - 130%	82
	S03_0-0.1	SE192028.004	%	60 - 130%	115
	S04_0-0.1	SE192028.005	%	60 - 130%	98
	S04_-0.4-0.5	SE192028.006	%	60 - 130%	103
	S05_0-0.1	SE192028.007	%	60 - 130%	88
	S05_0.4-0.5	SE192028.008	%	60 - 130%	96
	S06_0-0.1	SE192028.009	%	60 - 130%	75
	S06_0.4-0.5	SE192028.010	%	60 - 130%	103
	S07_0-0.1	SE192028.011	%	60 - 130%	92
	S08_0-0.1	SE192028.012	%	60 - 130%	102
	S08_0.3-0.4	SE192028.013	%	60 - 130%	102
	S09_0-0.1	SE192028.014	%	60 - 130%	100
	S10_0-0.1	SE192028.015	%	60 - 130%	102
	S11_0-0.1	SE192028.016	%	60 - 130%	99
	S11_0.4-0.5	SE192028.017	%	60 - 130%	104
	S12_0-0.1	SE192028.018	%	60 - 130%	92
	S13_0-0.1	SE192028.019	%	60 - 130%	89
	S14_0-0.1	SE192028.020	%	60 - 130%	80
	S14_0.4-0.5	SE192028.021	%	60 - 130%	74
	S15_0-0.1	SE192028.022	%	60 - 130%	76
	S16_0-0.1	SE192028.023	%	60 - 130%	75
	S17_0-0.1	SE192028.024	%	60 - 130%	73
	S18_0-0.1	SE192028.025	%	60 - 130%	72
	S19_0-0.1	SE192028.026	%	60 - 130%	75
	S19_0.4-0.5	SE192028.027	%	60 - 130%	75
	S20_0-0.1	SE192028.028	%	60 - 130%	71
	S20_0.4-0.5	SE192028.029	%	60 - 130%	78
	S21_0-0.1	SE192028.030	%	60 - 130%	71
	S22_0-0.1	SE192028.031	%	60 - 130%	70
	S23_0-0.1	SE192028.032	%	60 - 130%	75
	S24_0-0.1	SE192028.033	%	60 - 130%	74
	S25_0-0.2	SE192028.034	%	60 - 130%	74
	S26_0-0.2	SE192028.035	%	60 - 130%	78
	QC01	SE192028.036	%	60 - 130%	74
	QC03	SE192028.037	%	60 - 130%	80
	TB01	SE192028.039	%	60 - 130%	73
	TS01	SE192028.040	%	60 - 130%	83

VOCs in Water

Method: ME-(AU)-[ENV]AN433

Parameter	Sample Name	Sample Number	Units

Surrogate results are evaluated against upper and lower limit criteria established in the SGS QA/QC plan (Ref: MP-(AU)-[ENV]QU-022). At least two of three routine level soil sample surrogate spike recoveries for BTEX/VOC are to be within 70-130% where control charts have not been developed and within the established control limits for charted surrogates. Matrix effects may void this as an acceptance criterion. Water sample surrogate spike recoveries are to be within 40-130%. The presence of emulsions, surfactants and particulates may void this as an acceptance criterion.

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VOCs in Water (continued) Method: ME-(AU)-[ENV]AN433

Parameter	Sample Name	Sample Number	Units	Criteria	Recovery %
Bromofluorobenzene (Surrogate)	FB01	SE192028.038	%	40 - 130%	79
	Rinsate_170419	SE192028.041	%	40 - 130%	99
d4-1,2-dichloroethane (Surrogate)	FB01	SE192028.038	%	40 - 130%	128
	Rinsate_170419	SE192028.041	%	40 - 130%	117
d8-toluene (Surrogate)	FB01	SE192028.038	%	40 - 130%	82
	Rinsate_170419	SE192028.041	%	40 - 130%	90
Dibromofluoromethane (Surrogate)	FB01	SE192028.038	%	40 - 130%	120
	Rinsate_170419	SE192028.041	%	40 - 130%	127

Volatile Petroleum Hydrocarbons in Soil Method: ME-(AU)-[ENV]AN433

Parameter	Sample Name	Sample Number	Units	Criteria	Recovery %
Bromofluorobenzene (Surrogate)	S01_0-0.1	SE192028.001	%	60 - 130%	79
	S02_0-0.1	SE192028.002	%	60 - 130%	85
	S02_0.4-0.5	SE192028.003	%	60 - 130%	79
	S03_0-0.1	SE192028.004	%	60 - 130%	93
	S04_0-0.1	SE192028.005	%	60 - 130%	81
	S04_-0.4-0.5	SE192028.006	%	60 - 130%	77
	S05_0-0.1	SE192028.007	%	60 - 130%	78
	S05_0.4-0.5	SE192028.008	%	60 - 130%	74
	S06_0-0.1	SE192028.009	%	60 - 130%	71
	S06_0.4-0.5	SE192028.010	%	60 - 130%	77
	S07_0-0.1	SE192028.011	%	60 - 130%	74
	S08_0-0.1	SE192028.012	%	60 - 130%	79
	S08_0.3-0.4	SE192028.013	%	60 - 130%	77
	S09_0-0.1	SE192028.014	%	60 - 130%	76
	S10_0-0.1	SE192028.015	%	60 - 130%	76
	S11_0-0.1	SE192028.016	%	60 - 130%	72
	S11_0.4-0.5	SE192028.017	%	60 - 130%	77
	S12_0-0.1	SE192028.018	%	60 - 130%	75
	S13_0-0.1	SE192028.019	%	60 - 130%	75
	S14_0-0.1	SE192028.020	%	60 - 130%	78
	S14_0.4-0.5	SE192028.021	%	60 - 130%	79
	S15_0-0.1	SE192028.022	%	60 - 130%	78
	S16_0-0.1	SE192028.023	%	60 - 130%	71
	S17_0-0.1	SE192028.024	%	60 - 130%	74
	S18_0-0.1	SE192028.025	%	60 - 130%	77
	S19_0-0.1	SE192028.026	%	60 - 130%	74
	S19_0.4-0.5	SE192028.027	%	60 - 130%	74
	S20_0-0.1	SE192028.028	%	60 - 130%	71
	S20_0.4-0.5	SE192028.029	%	60 - 130%	75
	S21_0-0.1	SE192028.030	%	60 - 130%	73
	S22_0-0.1	SE192028.031	%	60 - 130%	76
	S23_0-0.1	SE192028.032	%	60 - 130%	80
	S24_0-0.1	SE192028.033	%	60 - 130%	77
	S25_0-0.2	SE192028.034	%	60 - 130%	77
	S26_0-0.2	SE192028.035	%	60 - 130%	77
	QC01	SE192028.036	%	60 - 130%	78
	QC03	SE192028.037	%	60 - 130%	75
	TB01	SE192028.039	%	60 - 130%	77
d4-1,2-dichloroethane (Surrogate)	S01_0-0.1	SE192028.001	%	60 - 130%	107
	S02_0-0.1	SE192028.002	%	60 - 130%	116
	S02_0.4-0.5	SE192028.003	%	60 - 130%	85
	S03_0-0.1	SE192028.004	%	60 - 130%	121
	S04_0-0.1	SE192028.005	%	60 - 130%	102
	S04_-0.4-0.5	SE192028.006	%	60 - 130%	108
	S05_0-0.1	SE192028.007	%	60 - 130%	92
	S05_0.4-0.5	SE192028.008	%	60 - 130%	99
	S06_0-0.1	SE192028.009	%	60 - 130%	79
	S06_0.4-0.5	SE192028.010	%	60 - 130%	106
	S07_0-0.1	SE192028.011	%	60 - 130%	98
	S08_0-0.1	SE192028.012	%	60 - 130%	109

Surrogate results are evaluated against upper and lower limit criteria established in the SGS QA/QC plan (Ref: MP-(AU)-[ENV]QU-022). At least two of three routine level soil sample surrogate spike recoveries for BTEX/VOC are to be within 70-130% where control charts have not been developed and within the established control limits for charted surrogates. Matrix effects may void this as an acceptance criterion. Water sample surrogate spike recoveries are to be within 40-130%. The presence of emulsions, surfactants and particulates may void this as an acceptance criterion.

Result is shown in **Green** when within suggested criteria or **Red** with an appended reason identifer when outside suggested criteria. Refer to the footnotes section at the end of this report for failure reasons.

Volatile Petroleum Hydrocarbons in Soil (continued)

Method: ME-(AU)-[ENV]AN433

Parameter	Sample Name	Sample Number	Units	Criteria	Recovery %
d4-1,2-dichloroethane (Surrogate)	S08_0.3-0.4	SE192028.013	%	60 - 130%	110
	S09_0-0.1	SE192028.014	%	60 - 130%	107
	S10_0-0.1	SE192028.015	%	60 - 130%	107
	S11_0-0.1	SE192028.016	%	60 - 130%	105
	S11_0.4-0.5	SE192028.017	%	60 - 130%	108
	S12_0-0.1	SE192028.018	%	60 - 130%	100
	S13_0-0.1	SE192028.019	%	60 - 130%	98
	S14_0-0.1	SE192028.020	%	60 - 130%	88
	S14_0.4-0.5	SE192028.021	%	60 - 130%	76
	S15_0-0.1	SE192028.022	%	60 - 130%	78
	S16_0-0.1	SE192028.023	%	60 - 130%	73
	S17_0-0.1	SE192028.024	%	60 - 130%	76
	S18_0-0.1	SE192028.025	%	60 - 130%	79
	S19_0-0.1	SE192028.026	%	60 - 130%	78
	S19_0.4-0.5	SE192028.027	%	60 - 130%	74
	S20_0-0.1	SE192028.028	%	60 - 130%	70
	S20_0.4-0.5	SE192028.029	%	60 - 130%	74
	S21_0-0.1	SE192028.030	%	60 - 130%	75
	S22_0-0.1	SE192028.031	%	60 - 130%	72
	S23_0-0.1	SE192028.032	%	60 - 130%	77
	S24_0-0.1	SE192028.033	%	60 - 130%	72
	S25_0-0.2	SE192028.034	%	60 - 130%	74
	S26_0-0.2	SE192028.035	%	60 - 130%	74
	QC01	SE192028.036	%	60 - 130%	75
	QC03	SE192028.037	%	60 - 130%	80
	TB01	SE192028.039	%	60 - 130%	79
d8-toluene (Surrogate)	S01_0-0.1	SE192028.001	%	60 - 130%	78
	S02_0-0.1	SE192028.002	%	60 - 130%	85
	S02_0.4-0.5	SE192028.003	%	60 - 130%	79
	S03_0-0.1	SE192028.004	%	60 - 130%	94
	S04_0-0.1	SE192028.005	%	60 - 130%	81
	S04_-0.4-0.5	SE192028.006	%	60 - 130%	77
	S05_0-0.1	SE192028.007	%	60 - 130%	74
	S05_0.4-0.5	SE192028.008	%	60 - 130%	73
	S06_0-0.1	SE192028.009	%	60 - 130%	72
	S06_0.4-0.5	SE192028.010	%	60 - 130%	77
	S07_0-0.1	SE192028.011	%	60 - 130%	75
	S08_0-0.1	SE192028.012	%	60 - 130%	79
	S08_0.3-0.4	SE192028.013	%	60 - 130%	77
	S09_0-0.1	SE192028.014	%	60 - 130%	78
	S10_0-0.1	SE192028.015	%	60 - 130%	76
	S11_0-0.1	SE192028.016	%	60 - 130%	74
	S11_0.4-0.5	SE192028.017	%	60 - 130%	78
	S12_0-0.1	SE192028.018	%	60 - 130%	71
	S13_0-0.1	SE192028.019	%	60 - 130%	70
	S14_0-0.1	SE192028.020	%	60 - 130%	77
	S14_0.4-0.5	SE192028.021	%	60 - 130%	79
	S15_0-0.1	SE192028.022	%	60 - 130%	72
	S16_0-0.1	SE192028.023	%	60 - 130%	75
	S17_0-0.1	SE192028.024	%	60 - 130%	79
	S18_0-0.1	SE192028.025	%	60 - 130%	71
	S19_0-0.1	SE192028.026	%	60 - 130%	73
	S19_0.4-0.5	SE192028.027	%	60 - 130%	79
	S20_0-0.1	SE192028.028	%	60 - 130%	71
	S20_0.4-0.5	SE192028.029	%	60 - 130%	77
	S21_0-0.1	SE192028.030	%	60 - 130%	77
	S22_0-0.1	SE192028.031	%	60 - 130%	82
	S23_0-0.1	SE192028.032	%	60 - 130%	79
	S24_0-0.1	SE192028.033	%	60 - 130%	88
	S25_0-0.2	SE192028.034	%	60 - 130%	79
	S26_0-0.2	SE192028.035	%	60 - 130%	76

Surrogate results are evaluated against upper and lower limit criteria established in the SGS QA /QC plan (Ref: MP-(AU)-[ENV]QU-022). At least two of three routine level soil sample surrogate spike recoveries for BTEX/VOC are to be within 70-130% where control charts have not been developed and within the established control limits for charted surrogates. Matrix effects may void this as an acceptance criterion. Water sample surrogate spike recoveries are to be within 40-130%. The presence of emulsions, surfactants and particulates may void this as an acceptance criterion.

Result is shown in **Green** when within suggested criteria or **Red** with an appended reason identifer when outside suggested criteria. Refer to the footnotes section at the end of this report for failure reasons.

Volatile Petroleum Hydrocarbons in Soil (continued) Method: ME-(AU)-[ENV]AN433

Parameter	Sample Name	Sample Number	Units	Criteria	Recovery %
d8-toluene (Surrogate)	QC01	SE192028.036	%	60 - 130%	77
	QC03	SE192028.037	%	60 - 130%	75
	TB01	SE192028.039	%	60 - 130%	76
Dibromofluoromethane (Surrogate)	S01_0-0.1	SE192028.001	%	60 - 130%	105
	S02_0-0.1	SE192028.002	%	60 - 130%	112
	S02_0.4-0.5	SE192028.003	%	60 - 130%	82
	S03_0-0.1	SE192028.004	%	60 - 130%	115
	S04_0-0.1	SE192028.005	%	60 - 130%	98
	S04_-0.4-0.5	SE192028.006	%	60 - 130%	103
	S05_0-0.1	SE192028.007	%	60 - 130%	88
	S05_0.4-0.5	SE192028.008	%	60 - 130%	96
	S06_0-0.1	SE192028.009	%	60 - 130%	75
	S06_0.4-0.5	SE192028.010	%	60 - 130%	103
	S07_0-0.1	SE192028.011	%	60 - 130%	92
	S08_0-0.1	SE192028.012	%	60 - 130%	102
	S08_0.3-0.4	SE192028.013	%	60 - 130%	102
	S09_0-0.1	SE192028.014	%	60 - 130%	100
	S10_0-0.1	SE192028.015	%	60 - 130%	102
	S11_0-0.1	SE192028.016	%	60 - 130%	99
	S11_0.4-0.5	SE192028.017	%	60 - 130%	104
	S12_0-0.1	SE192028.018	%	60 - 130%	92
	S13_0-0.1	SE192028.019	%	60 - 130%	89
	S14_0-0.1	SE192028.020	%	60 - 130%	80
	S14_0.4-0.5	SE192028.021	%	60 - 130%	74
	S15_0-0.1	SE192028.022	%	60 - 130%	76
	S16_0-0.1	SE192028.023	%	60 - 130%	75
	S17_0-0.1	SE192028.024	%	60 - 130%	73
	S18_0-0.1	SE192028.025	%	60 - 130%	72
	S19_0-0.1	SE192028.026	%	60 - 130%	75
	S19_0.4-0.5	SE192028.027	%	60 - 130%	75
	S20_0-0.1	SE192028.028	%	60 - 130%	71
	S20_0.4-0.5	SE192028.029	%	60 - 130%	78
	S21_0-0.1	SE192028.030	%	60 - 130%	71
	S22_0-0.1	SE192028.031	%	60 - 130%	70
	S23_0-0.1	SE192028.032	%	60 - 130%	75
	S24_0-0.1	SE192028.033	%	60 - 130%	74
	S25_0-0.2	SE192028.034	%	60 - 130%	74
	S26_0-0.2	SE192028.035	%	60 - 130%	78
	QC01	SE192028.036	%	60 - 130%	74
	QC03	SE192028.037	%	60 - 130%	80
	TB01	SE192028.039	%	60 - 130%	73

Volatile Petroleum Hydrocarbons in Water Method: ME-(AU)-[ENV]AN433

Parameter	Sample Name	Sample Number	Units	Criteria	Recovery %
Bromofluorobenzene (Surrogate)	FB01	SE192028.038	%	40 - 130%	79
	Rinsate_170419	SE192028.041	%	40 - 130%	99
d4-1,2-dichloroethane (Surrogate)	FB01	SE192028.038	%	60 - 130%	128
	Rinsate_170419	SE192028.041	%	60 - 130%	117
d8-toluene (Surrogate)	FB01	SE192028.038	%	40 - 130%	82
	Rinsate_170419	SE192028.041	%	40 - 130%	90
Dibromofluoromethane (Surrogate)	FB01	SE192028.038	%	40 - 130%	120
	Rinsate_170419	SE192028.041	%	40 - 130%	127

Blank results are evaluated against the limit of reporting (LOR), for the chosen method and its associated instrumentation, typically 2.5 times the statistically determined method detection limit (MDL).

Result is shown in **Green** when within suggested criteria or **Red** with an appended dagger symbol (†) when outside suggested criteria.

Mercury (dissolved) in Water

Method: ME-(AU)-[ENV]AN311(Perth)/AN312

Sample Number	Parameter	Units	LOR	Result
LB172370.001	Mercury	mg/L	0.0001	<0.0001

Mercury in Soil

Method: ME-(AU)-[ENV]AN312

Sample Number	Parameter	Units	LOR	Result
LB172303.001	Mercury	mg/kg	0.05	<0.05
LB172305.001	Mercury	mg/kg	0.05	<0.05

OC Pesticides in Soil

Method: ME-(AU)-[ENV]AN420

Sample Number		Parameter	Units	LOR	Result
LB172299.001		Hexachlorobenzene (HCB)	mg/kg	0.1	<0.1
		Alpha BHC	mg/kg	0.1	<0.1
		Lindane	mg/kg	0.1	<0.1
		Heptachlor	mg/kg	0.1	<0.1
		Aldrin	mg/kg	0.1	<0.1
		Beta BHC	mg/kg	0.1	<0.1
		Delta BHC	mg/kg	0.1	<0.1
		Heptachlor epoxide	mg/kg	0.1	<0.1
		Alpha Endosulfan	mg/kg	0.2	<0.2
		Gamma Chlordane	mg/kg	0.1	<0.1
		Alpha Chlordane	mg/kg	0.1	<0.1
		p,p'-DDE	mg/kg	0.1	<0.1
		Dieldrin	mg/kg	0.2	<0.2
		Endrin	mg/kg	0.2	<0.2
		Beta Endosulfan	mg/kg	0.2	<0.2
		p,p'-DDD	mg/kg	0.1	<0.1
		p,p'-DDT	mg/kg	0.1	<0.1
		Endosulfan sulphate	mg/kg	0.1	<0.1
		Endrin Aldehyde	mg/kg	0.1	<0.1
		Methoxychlor	mg/kg	0.1	<0.1
		Endrin Ketone	mg/kg	0.1	<0.1
		Isodrin	mg/kg	0.1	<0.1
		Mirex	mg/kg	0.1	<0.1
	Surrogates	Tetrachloro-m-xylene (TCMX) (Surrogate)	%	-	102
LB172300.001		Hexachlorobenzene (HCB)	mg/kg	0.1	<0.1
		Alpha BHC	mg/kg	0.1	<0.1
		Lindane	mg/kg	0.1	<0.1
		Heptachlor	mg/kg	0.1	<0.1
		Aldrin	mg/kg	0.1	<0.1
		Beta BHC	mg/kg	0.1	<0.1
		Delta BHC	mg/kg	0.1	<0.1
		Heptachlor epoxide	mg/kg	0.1	<0.1
		Alpha Endosulfan	mg/kg	0.2	<0.2
		Gamma Chlordane	mg/kg	0.1	<0.1
		Alpha Chlordane	mg/kg	0.1	<0.1
		p,p'-DDE	mg/kg	0.1	<0.1
		Dieldrin	mg/kg	0.2	<0.2
		Endrin	mg/kg	0.2	<0.2
		Beta Endosulfan	mg/kg	0.2	<0.2
		p,p'-DDD	mg/kg	0.1	<0.1
		p,p'-DDT	mg/kg	0.1	<0.1
		Endosulfan sulphate	mg/kg	0.1	<0.1
		Endrin Aldehyde	mg/kg	0.1	<0.1
		Methoxychlor	mg/kg	0.1	<0.1
		Endrin Ketone	mg/kg	0.1	<0.1
		Isodrin	mg/kg	0.1	<0.1
		Mirex	mg/kg	0.1	<0.1
	Surrogates	Tetrachloro-m-xylene (TCMX) (Surrogate)	%	-	95

Blank results are evaluated against the limit of reporting (LOR), for the chosen method and its associated instrumentation, typically 2.5 times the statistically determined method detection limit (MDL).

Result is shown in **Green** when within suggested criteria or **Red** with an appended dagger symbol (†) when outside suggested criteria.

OC Pesticides in Water

Method: ME-(AU)-[ENV]AN420

Sample Number		Parameter	Units	LOR	Result
LB172310.001		Alpha BHC	µg/L	0.1	<0.1
		Hexachlorobenzene (HCB)	µg/L	0.1	<0.1
		Beta BHC	µg/L	0.1	<0.1
		Lindane (gamma BHC)	µg/L	0.1	<0.1
		Delta BHC	µg/L	0.1	<0.1
		Heptachlor	µg/L	0.1	<0.1
		Aldrin	µg/L	0.1	<0.1
		Heptachlor epoxide	µg/L	0.1	<0.1
		Gamma Chlordane	µg/L	0.1	<0.1
		Alpha Chlordane	µg/L	0.1	<0.1
		Alpha Endosulfan	µg/L	0.1	<0.1
		p,p'-DDE	µg/L	0.1	<0.1
		Dieldrin	µg/L	0.1	<0.1
		Endrin	µg/L	0.1	<0.1
		Beta Endosulfan	µg/L	0.1	<0.1
		p,p'-DDD	µg/L	0.1	<0.1
		Endosulfan sulphate	µg/L	0.1	<0.1
		p,p'-DDT	µg/L	0.1	<0.1
		Endrin ketone	µg/L	0.1	<0.1
		Methoxychlor	µg/L	0.1	<0.1
		Endrin aldehyde	µg/L	0.1	<0.1
		Isodrin	µg/L	0.1	<0.1
		Mirex	µg/L	0.1	<0.1
	Surrogates	Tetrachloro-m-xylene (TCMX) (Surrogate)	%	-	79

OP Pesticides in Soil

Method: ME-(AU)-[ENV]AN420

Sample Number		Parameter	Units	LOR	Result
LB172299.001		Dichlorvos	mg/kg	0.5	<0.5
		Dimethoate	mg/kg	0.5	<0.5
		Diazinon (Dimpylate)	mg/kg	0.5	<0.5
		Fenitrothion	mg/kg	0.2	<0.2
		Malathion	mg/kg	0.2	<0.2
		Chlorpyrifos (Chlorpyrifos Ethyl)	mg/kg	0.2	<0.2
		Parathion-ethyl (Parathion)	mg/kg	0.2	<0.2
		Bromophos Ethyl	mg/kg	0.2	<0.2
		Methidathion	mg/kg	0.5	<0.5
		Ethion	mg/kg	0.2	<0.2
		Azinphos-methyl (Guthion)	mg/kg	0.2	<0.2
	Surrogates	2-fluorobiphenyl (Surrogate)	%	-	96
		d14-p-terphenyl (Surrogate)	%	-	102
LB172300.001		Dichlorvos	mg/kg	0.5	<0.5
		Dimethoate	mg/kg	0.5	<0.5
		Diazinon (Dimpylate)	mg/kg	0.5	<0.5
		Fenitrothion	mg/kg	0.2	<0.2
		Malathion	mg/kg	0.2	<0.2
		Chlorpyrifos (Chlorpyrifos Ethyl)	mg/kg	0.2	<0.2
		Parathion-ethyl (Parathion)	mg/kg	0.2	<0.2
		Bromophos Ethyl	mg/kg	0.2	<0.2
		Methidathion	mg/kg	0.5	<0.5
		Ethion	mg/kg	0.2	<0.2
		Azinphos-methyl (Guthion)	mg/kg	0.2	<0.2
	Surrogates	2-fluorobiphenyl (Surrogate)	%	-	94
		d14-p-terphenyl (Surrogate)	%	-	110

OP Pesticides in Water

Method: ME-(AU)-[ENV]AN420

Sample Number		Parameter	Units	LOR	Result
LB172310.001		Dichlorvos	µg/L	0.5	<0.5
		Dimethoate	µg/L	0.5	<0.5
		Diazinon (Dimpylate)	µg/L	0.5	<0.5
		Fenitrothion	µg/L	0.2	<0.2
		Malathion	µg/L	0.2	<0.2
		Chlorpyrifos (Chlorpyrifos Ethyl)	µg/L	0.2	<0.2

Blank results are evaluated against the limit of reporting (LOR), for the chosen method and its associated instrumentation, typically 2.5 times the statistically determined method detection limit (MDL).

Result is shown in **Green** when within suggested criteria or **Red** with an appended dagger symbol (†) when outside suggested criteria.

OP Pesticides in Water (continued)

Method: ME-(AU)-[ENV]AN420

Sample Number		Parameter	Units	LOR	Result
LB172310.001		Parathion-ethyl (Parathion)	µg/L	0.2	<0.2
		Bromophos Ethyl	µg/L	0.2	<0.2
		Methidathion	µg/L	0.5	<0.5
		Ethion	µg/L	0.2	<0.2
		Azinphos-methyl	µg/L	0.2	<0.2
	Surrogates	2-fluorobiphenyl (Surrogate)	%	-	66
		d14-p-terphenyl (Surrogate)	%	-	74

PAH (Polynuclear Aromatic Hydrocarbons) in Soil

Method: ME-(AU)-[ENV]AN420

Sample Number		Parameter	Units	LOR	Result
LB172299.001		Naphthalene	mg/kg	0.1	<0.1
		2-methylnaphthalene	mg/kg	0.1	<0.1
		1-methylnaphthalene	mg/kg	0.1	<0.1
		Acenaphthylene	mg/kg	0.1	<0.1
		Acenaphthene	mg/kg	0.1	<0.1
		Fluorene	mg/kg	0.1	<0.1
		Phenanthrene	mg/kg	0.1	<0.1
		Anthracene	mg/kg	0.1	<0.1
		Fluoranthene	mg/kg	0.1	<0.1
		Pyrene	mg/kg	0.1	<0.1
		Benzo(a)anthracene	mg/kg	0.1	<0.1
		Chrysene	mg/kg	0.1	<0.1
		Benzo(a)pyrene	mg/kg	0.1	<0.1
		Indeno(1,2,3-cd)pyrene	mg/kg	0.1	<0.1
		Dibenzo(ah)anthracene	mg/kg	0.1	<0.1
		Benzo(ghi)perylene	mg/kg	0.1	<0.1
		Total PAH (18)	mg/kg	0.8	<0.8
	Surrogates	d5-nitrobenzene (Surrogate)	%	-	104
		2-fluorobiphenyl (Surrogate)	%	-	96
		d14-p-terphenyl (Surrogate)	%	-	102
LB172300.001		Naphthalene	mg/kg	0.1	<0.1
		2-methylnaphthalene	mg/kg	0.1	<0.1
		1-methylnaphthalene	mg/kg	0.1	<0.1
		Acenaphthylene	mg/kg	0.1	<0.1
		Acenaphthene	mg/kg	0.1	<0.1
		Fluorene	mg/kg	0.1	<0.1
		Phenanthrene	mg/kg	0.1	<0.1
		Anthracene	mg/kg	0.1	<0.1
		Fluoranthene	mg/kg	0.1	<0.1
		Pyrene	mg/kg	0.1	<0.1
		Benzo(a)anthracene	mg/kg	0.1	<0.1
		Chrysene	mg/kg	0.1	<0.1
		Benzo(a)pyrene	mg/kg	0.1	<0.1
		Indeno(1,2,3-cd)pyrene	mg/kg	0.1	<0.1
		Dibenzo(ah)anthracene	mg/kg	0.1	<0.1
		Benzo(ghi)perylene	mg/kg	0.1	<0.1
		Total PAH (18)	mg/kg	0.8	<0.8
	Surrogates	d5-nitrobenzene (Surrogate)	%	-	108
		2-fluorobiphenyl (Surrogate)	%	-	94
		d14-p-terphenyl (Surrogate)	%	-	110

PAH (Polynuclear Aromatic Hydrocarbons) in Water

Method: ME-(AU)-[ENV]AN420

Sample Number		Parameter	Units	LOR	Result
LB172310.001		Naphthalene	µg/L	0.1	<0.1
		2-methylnaphthalene	µg/L	0.1	<0.1
		1-methylnaphthalene	µg/L	0.1	<0.1
		Acenaphthylene	µg/L	0.1	<0.1
		Acenaphthene	µg/L	0.1	<0.1
		Fluorene	µg/L	0.1	<0.1
		Phenanthrene	µg/L	0.1	<0.1
		Anthracene	µg/L	0.1	<0.1
		Fluoranthene	µg/L	0.1	<0.1

Blank results are evaluated against the limit of reporting (LOR), for the chosen method and its associated instrumentation, typically 2.5 times the statistically determined method detection limit (MDL).

Result is shown in **Green** when within suggested criteria or **Red** with an appended dagger symbol (†) when outside suggested criteria.

PAH (Polynuclear Aromatic Hydrocarbons) in Water (continued)

Method: ME-(AU)-[ENV]AN420

Sample Number		Parameter	Units	LOR	Result
LB172310.001		Pyrene	µg/L	0.1	<0.1
		Benzo(a)anthracene	µg/L	0.1	<0.1
		Chrysene	µg/L	0.1	<0.1
		Benzo(a)pyrene	µg/L	0.1	<0.1
		Indeno(1,2,3-cd)pyrene	µg/L	0.1	<0.1
		Dibenzo(ah)anthracene	µg/L	0.1	<0.1
		Benzo(ghi)perylene	µg/L	0.1	<0.1
	Surrogates	d5-nitrobenzene (Surrogate)	%	-	66
		2-fluorobiphenyl (Surrogate)	%	-	66
		d14-p-terphenyl (Surrogate)	%	-	74

PCBs in Soil

Method: ME-(AU)-[ENV]AN420

Sample Number		Parameter	Units	LOR	Result
LB172299.001		Arochlor 1016	mg/kg	0.2	<0.2
		Arochlor 1221	mg/kg	0.2	<0.2
		Arochlor 1232	mg/kg	0.2	<0.2
		Arochlor 1242	mg/kg	0.2	<0.2
		Arochlor 1248	mg/kg	0.2	<0.2
		Arochlor 1254	mg/kg	0.2	<0.2
		Arochlor 1260	mg/kg	0.2	<0.2
		Arochlor 1262	mg/kg	0.2	<0.2
		Arochlor 1268	mg/kg	0.2	<0.2
		Total PCBs (Arochlors)	mg/kg	1	<1
	Surrogates	Tetrachloro-m-xylene (TCMX) (Surrogate)	%	-	102
LB172300.001		Arochlor 1016	mg/kg	0.2	<0.2
		Arochlor 1221	mg/kg	0.2	<0.2
		Arochlor 1232	mg/kg	0.2	<0.2
		Arochlor 1242	mg/kg	0.2	<0.2
		Arochlor 1248	mg/kg	0.2	<0.2
		Arochlor 1254	mg/kg	0.2	<0.2
		Arochlor 1260	mg/kg	0.2	<0.2
		Arochlor 1262	mg/kg	0.2	<0.2
		Arochlor 1268	mg/kg	0.2	<0.2
		Total PCBs (Arochlors)	mg/kg	1	<1
	Surrogates	Tetrachloro-m-xylene (TCMX) (Surrogate)	%	-	95

PCBs in Water

Method: ME-(AU)-[ENV]AN420

Sample Number	Parameter	Units	LOR	Result
LB172310.001	Arochlor 1016	µg/L	1	<1
	Arochlor 1221	µg/L	1	<1
	Arochlor 1232	µg/L	1	<1
	Arochlor 1242	µg/L	1	<1
	Arochlor 1248	µg/L	1	<1
	Arochlor 1254	µg/L	1	<1
	Arochlor 1260	µg/L	1	<1
	Arochlor 1262	µg/L	1	<1
	Arochlor 1268	µg/L	1	<1

Total Recoverable Elements in Soil/Waste Solids/Materials by ICPOES

Method: ME-(AU)-[ENV]AN040/AN320

Sample Number	Parameter	Units	LOR	Result
LB172303.001	Arsenic, As	mg/kg	1	2
	Cadmium, Cd	mg/kg	0.3	<0.3
	Chromium, Cr	mg/kg	0.3	<0.3
	Copper, Cu	mg/kg	0.5	<0.5
	Nickel, Ni	mg/kg	0.5	<0.5
	Lead, Pb	mg/kg	1	<1
	Zinc, Zn	mg/kg	2	<2.0
LB172304.001	Arsenic, As	mg/kg	1	2
	Cadmium, Cd	mg/kg	0.3	<0.3
	Chromium, Cr	mg/kg	0.3	<0.3
	Copper, Cu	mg/kg	0.5	<0.5
	Nickel, Ni	mg/kg	0.5	<0.5

Blank results are evaluated against the limit of reporting (LOR), for the chosen method and its associated instrumentation, typically 2.5 times the statistically determined method detection limit (MDL).

Result is shown in **Green** when within suggested criteria or **Red** with an appended dagger symbol (†) when outside suggested criteria.

Total Recoverable Elements in Soil/Waste Solids/Materials by ICPOES (continued)

Method: ME-(AU)-[ENV]AN040/AN320

Sample Number	Parameter	Units	LOR	Result
LB172304.001	Lead, Pb	mg/kg	1	<1
	Zinc, Zn	mg/kg	2	<2.0

Trace Metals (Dissolved) in Water by ICPMS

Method: ME-(AU)-[ENV]AN318

Sample Number	Parameter	Units	LOR	Result
LB172364.001	Arsenic, As	µg/L	1	<1
	Cadmium, Cd	µg/L	0.1	<0.1
	Chromium, Cr	µg/L	1	<1
	Copper, Cu	µg/L	1	<1
	Lead, Pb	µg/L	1	<1
	Nickel, Ni	µg/L	1	<1
	Zinc, Zn	µg/L	5	<5

TRH (Total Recoverable Hydrocarbons) in Soil

Method: ME-(AU)-[ENV]AN403

Sample Number	Parameter	Units	LOR	Result
LB172299.001	TRH C10-C14	mg/kg	20	<20
	TRH C15-C28	mg/kg	45	<45
	TRH C29-C36	mg/kg	45	<45
	TRH C37-C40	mg/kg	100	<100
	TRH C10-C36 Total	mg/kg	110	<110
LB172300.001	TRH C10-C14	mg/kg	20	<20
	TRH C15-C28	mg/kg	45	<45
	TRH C29-C36	mg/kg	45	<45
	TRH C37-C40	mg/kg	100	<100
	TRH C10-C36 Total	mg/kg	110	<110

TRH (Total Recoverable Hydrocarbons) in Water

Method: ME-(AU)-[ENV]AN403

Sample Number	Parameter	Units	LOR	Result
LB172310.001	TRH C10-C14	µg/L	50	<50
	TRH C15-C28	µg/L	200	<200
	TRH C29-C36	µg/L	200	<200
	TRH C37-C40	µg/L	200	<200

VOC's in Soil

Method: ME-(AU)-[ENV]AN433

Sample Number		Parameter	Units	LOR	Result
LB172297.001	Monocyclic Aromatic Hydrocarbons	Benzene	mg/kg	0.1	<0.1
		Toluene	mg/kg	0.1	<0.1
		Ethylbenzene	mg/kg	0.1	<0.1
		m/p-xylene	mg/kg	0.2	<0.2
		o-xylene	mg/kg	0.1	<0.1
	Polycyclic VOCs	Naphthalene	mg/kg	0.1	<0.1
	Surrogates	Dibromofluoromethane (Surrogate)	%	-	92
		d4-1,2-dichloroethane (Surrogate)	%	-	95
		d8-toluene (Surrogate)	%	-	82
		Bromofluorobenzene (Surrogate)	%	-	83
	Totals	Total BTEX	mg/kg	0.6	<0.6
LB172298.001	Monocyclic Aromatic Hydrocarbons	Benzene	mg/kg	0.1	<0.1
		Toluene	mg/kg	0.1	<0.1
		Ethylbenzene	mg/kg	0.1	<0.1
		m/p-xylene	mg/kg	0.2	<0.2
		o-xylene	mg/kg	0.1	<0.1
	Polycyclic VOCs	Naphthalene	mg/kg	0.1	<0.1
	Surrogates	Dibromofluoromethane (Surrogate)	%	-	77
		d4-1,2-dichloroethane (Surrogate)	%	-	76
		d8-toluene (Surrogate)	%	-	71
		Bromofluorobenzene (Surrogate)	%	-	72
	Totals	Total BTEX	mg/kg	0.6	<0.6

VOCs in Water

Method: ME-(AU)-[ENV]AN433

Sample Number		Parameter	Units	LOR	Result
LB172301.001	Monocyclic Aromatic Hydrocarbons	Benzene	µg/L	0.5	<0.5
		Toluene	µg/L	0.5	<0.5
		Ethylbenzene	µg/L	0.5	<0.5

Blank results are evaluated against the limit of reporting (LOR), for the chosen method and its associated instrumentation, typically 2.5 times the statistically determined method detection limit (MDL).

Result is shown in **Green** when within suggested criteria or **Red** with an appended dagger symbol (†) when outside suggested criteria.

VOCs in Water (continued) — Method: ME-(AU)-[ENV]AN433

Sample Number		Parameter	Units	LOR	Result
LB172301.001	Monocyclic Aromatic	m/p-xylene	µg/L	1	<1
	Hydrocarbons	o-xylene	µg/L	0.5	<0.5
	Polycyclic VOCs	Naphthalene	µg/L	0.5	<0.5
	Surrogates	Dibromofluoromethane (Surrogate)	%	-	111
		d4-1,2-dichloroethane (Surrogate)	%	-	122
		d8-toluene (Surrogate)	%	-	83
		Bromofluorobenzene (Surrogate)	%	-	96

Volatile Petroleum Hydrocarbons in Soil — Method: ME-(AU)-[ENV]AN433

Sample Number		Parameter	Units	LOR	Result
LB172297.001		TRH C6-C9	mg/kg	20	<20
	Surrogates	Dibromofluoromethane (Surrogate)	%	-	92
		d4-1,2-dichloroethane (Surrogate)	%	-	95
		d8-toluene (Surrogate)	%	-	82
LB172298.001		TRH C6-C9	mg/kg	20	<20
	Surrogates	Dibromofluoromethane (Surrogate)	%	-	77
		d4-1,2-dichloroethane (Surrogate)	%	-	76
		d8-toluene (Surrogate)	%	-	71

Volatile Petroleum Hydrocarbons in Water — Method: ME-(AU)-[ENV]AN433

Sample Number		Parameter	Units	LOR	Result
LB172301.001		TRH C6-C9	µg/L	40	<40
	Surrogates	Dibromofluoromethane (Surrogate)	%	-	111
		d4-1,2-dichloroethane (Surrogate)	%	-	122
		d8-toluene (Surrogate)	%	-	83
		Bromofluorobenzene (Surrogate)	%	-	96

Duplicates are calculated as Relative Percentage Difference (RPD) using the formula: RPD = | OriginalResult - ReplicateResult | x 100 / Mean

The RPD is evaluated against the Maximum Allowable Difference (MAD) criteria and can be graphically represented by a curve calculated from the Statistical Detection Limit (SDL) and Limiting Repeatability (LR) using the formula: MAD = 100 x SDL / Mean + LR

Where the Maximum Allowable Difference evaluates to a number larger than 200 it is displayed as 200.

RPD is shown in **Green** when within suggested criteria or **Red** with an appended reason identifer when outside suggested criteria. Refer to the footnotes section at the end of this report for failure reasons.

Mercury (dissolved) in Water

Method: ME-(AU)-[ENV]AN311(Perth)/AN312

Original	Duplicate	Parameter	Units	LOR	Original	Duplicate	Criteria %	RPD %
SE191791.009	LB172370.014	Mercury	μg/L	0.0001	<0.0001	0.0000	200	94

Mercury in Soil

Method: ME-(AU)-[ENV]AN312

Original	Duplicate	Parameter	Units	LOR	Original	Duplicate	Criteria %	RPD %
SE192028.010	LB172303.014	Mercury	mg/kg	0.05	0.09	0.09	86	2
SE192028.019	LB172303.024	Mercury	mg/kg	0.05	0.22	0.46	45	69 ②
SE192028.029	LB172305.014	Mercury	mg/kg	0.05	<0.05	<0.05	200	0
SE192028.037	LB172305.023	Mercury	mg/kg	0.05	<0.05	<0.05	200	0

Moisture Content

Method: ME-(AU)-[ENV]AN002

Original	Duplicate	Parameter	Units	LOR	Original	Duplicate	Criteria %	RPD %
SE192028.010	LB172306.011	% Moisture	%w/w	0.5	22	21	35	5
SE192028.019	LB172306.021	% Moisture	%w/w	0.5	12	11	39	7
SE192028.029	LB172307.011	% Moisture	%w/w	0.5	3.8	6.1	50	46
SE192028.039	LB172307.021	% Moisture	%w/w	0.5	6.4	5.8	46	9

OC Pesticides in Soil

Method: ME-(AU)-[ENV]AN420

Original	Duplicate		Parameter	Units	LOR	Original	Duplicate	Criteria %	RPD %
SE192028.011	LB172299.027		Hexachlorobenzene (HCB)	mg/kg	0.1	<0.1	0	200	0
			Alpha BHC	mg/kg	0.1	<0.1	0	200	0
			Lindane	mg/kg	0.1	<0.1	0	200	0
			Heptachlor	mg/kg	0.1	<0.1	0	200	0
			Aldrin	mg/kg	0.1	<0.1	0	200	0
			Beta BHC	mg/kg	0.1	<0.1	0	200	0
			Delta BHC	mg/kg	0.1	<0.1	0	200	0
			Heptachlor epoxide	mg/kg	0.1	<0.1	0	200	0
			o,p'-DDE	mg/kg	0.1	<0.1	0	200	0
			Alpha Endosulfan	mg/kg	0.2	<0.2	0	200	0
			Gamma Chlordane	mg/kg	0.1	<0.1	0	200	0
			Alpha Chlordane	mg/kg	0.1	<0.1	0	200	0
			trans-Nonachlor	mg/kg	0.1	<0.1	0	200	0
			p,p'-DDE	mg/kg	0.1	<0.1	0	200	0
			Dieldrin	mg/kg	0.2	<0.2	0	200	0
			Endrin	mg/kg	0.2	<0.2	0	200	0
			o,p'-DDD	mg/kg	0.1	<0.1	0	200	0
			o,p'-DDT	mg/kg	0.1	<0.1	0	200	0
			Beta Endosulfan	mg/kg	0.2	<0.2	0	200	0
			p,p'-DDD	mg/kg	0.1	<0.1	0	200	0
			p,p'-DDT	mg/kg	0.1	<0.1	0	200	0
			Endosulfan sulphate	mg/kg	0.1	<0.1	0	200	0
			Endrin Aldehyde	mg/kg	0.1	<0.1	0	200	0
			Methoxychlor	mg/kg	0.1	<0.1	0	200	0
			Endrin Ketone	mg/kg	0.1	<0.1	0	200	0
			Isodrin	mg/kg	0.1	<0.1	0	200	0
			Mirex	mg/kg	0.1	<0.1	0	200	0
			Total CLP OC Pesticides	mg/kg	1	<1	0	200	0
		Surrogates	Tetrachloro-m-xylene (TCMX) (Surrogate)	mg/kg	-	0.16	0.161	30	2
SE192028.029	LB172300.023		Hexachlorobenzene (HCB)	mg/kg	0.1	<0.1	0	200	0
			Alpha BHC	mg/kg	0.1	<0.1	0	200	0
			Lindane	mg/kg	0.1	<0.1	0	200	0
			Heptachlor	mg/kg	0.1	<0.1	0	200	0
			Aldrin	mg/kg	0.1	<0.1	0	200	0
			Beta BHC	mg/kg	0.1	<0.1	0	200	0
			Delta BHC	mg/kg	0.1	<0.1	0	200	0
			Heptachlor epoxide	mg/kg	0.1	<0.1	0	200	0
			o,p'-DDE	mg/kg	0.1	<0.1	0	200	0
			Alpha Endosulfan	mg/kg	0.2	<0.2	0	200	0
			Gamma Chlordane	mg/kg	0.1	<0.1	0	200	0
			Alpha Chlordane	mg/kg	0.1	<0.1	0	200	0
			trans-Nonachlor	mg/kg	0.1	<0.1	0	200	0

Duplicates are calculated as Relative Percentage Difference (RPD) using the formula: RPD = | OriginalResult - ReplicateResult | x 100 / Mean

The RPD is evaluated against the Maximum Allowable Difference (MAD) criteria and can be graphically represented by a curve calculated from the Statistical Detection Limit (SDL) and Limiting Repeatability (LR) using the formula: MAD = 100 x SDL / Mean + LR

Where the Maximum Allowable Difference evaluates to a number larger than 200 it is displayed as 200.

RPD is shown in **Green** when within suggested criteria or **Red** with an appended reason identifer when outside suggested criteria. Refer to the footnotes section at the end of this report for failure reasons.

OC Pesticides in Soil (continued)

Method: ME-(AU)-[ENV]AN420

Original	Duplicate		Parameter	Units	LOR	Original	Duplicate	Criteria %	RPD %
SE192028.029	LB172300.023		p,p'-DDE	mg/kg	0.1	<0.1	0	200	0
			Dieldrin	mg/kg	0.2	<0.2	0	200	0
			Endrin	mg/kg	0.2	<0.2	0	200	0
			o,p'-DDD	mg/kg	0.1	<0.1	0	200	0
			o,p'-DDT	mg/kg	0.1	<0.1	0	200	0
			Beta Endosulfan	mg/kg	0.2	<0.2	0	200	0
			p,p'-DDD	mg/kg	0.1	<0.1	0	200	0
			p,p'-DDT	mg/kg	0.1	<0.1	0	200	0
			Endosulfan sulphate	mg/kg	0.1	<0.1	0	200	0
			Endrin Aldehyde	mg/kg	0.1	<0.1	0	200	0
			Methoxychlor	mg/kg	0.1	<0.1	0	200	0
			Endrin Ketone	mg/kg	0.1	<0.1	0	200	0
			Isodrin	mg/kg	0.1	<0.1	0	200	0
			Mirex	mg/kg	0.1	<0.1	0	200	0
			Total CLP OC Pesticides	mg/kg	1	<1	0	200	0
		Surrogates	Tetrachloro-m-xylene (TCMX) (Surrogate)	mg/kg	-	0.15	0.148	30	0

OC Pesticides in Water

Method: ME-(AU)-[ENV]AN420

Original	Duplicate		Parameter	Units	LOR	Original	Duplicate	Criteria %	RPD %
SE191810.002	LB172310.025		Alpha BHC	µg/L	0.1	<0.1	<0.1	200	0
			Hexachlorobenzene (HCB)	µg/L	0.1	<0.1	<0.1	200	0
			Beta BHC	µg/L	0.1	<0.1	<0.1	200	0
			Lindane (gamma BHC)	µg/L	0.1	<0.1	<0.1	200	0
			Delta BHC	µg/L	0.1	<0.1	<0.1	200	0
			Heptachlor	µg/L	0.1	<0.1	<0.1	200	0
			Aldrin	µg/L	0.1	<0.1	<0.1	200	0
			Heptachlor epoxide	µg/L	0.1	<0.1	<0.1	200	0
			Gamma Chlordane	µg/L	0.1	<0.1	<0.1	200	0
			Alpha Chlordane	µg/L	0.1	<0.1	<0.1	200	0
			Alpha Endosulfan	µg/L	0.1	<0.1	<0.1	200	0
			o,p'-DDE	µg/L	0.1	<0.1	<0.1	200	0
			p,p'-DDE	µg/L	0.1	<0.1	<0.1	200	0
			Dieldrin	µg/L	0.1	<0.1	<0.1	200	0
			Endrin	µg/L	0.1	<0.1	<0.1	200	0
			Beta Endosulfan	µg/L	0.1	<0.1	<0.1	200	0
			o,p'-DDD	µg/L	0.1	<0.1	<0.1	200	0
			p,p'-DDD	µg/L	0.1	<0.1	<0.1	200	0
			Endosulfan sulphate	µg/L	0.1	<0.1	<0.1	200	0
			o,p'-DDT	µg/L	0.1	<0.1	<0.1	200	0
			p,p'-DDT	µg/L	0.1	<0.1	<0.1	200	0
			Endrin ketone	µg/L	0.1	<0.1	<0.1	200	0
			Methoxychlor	µg/L	0.1	<0.1	<0.1	200	0
			trans-Nonachlor	µg/L	0.1	<0.1	<0.1	200	0
			Endrin aldehyde	µg/L	0.1	<0.1	<0.1	200	0
			Isodrin	µg/L	0.1	<0.1	<0.1	200	0
			Mirex	µg/L	0.1	<0.1	<0.1	200	0
		Surrogates	Tetrachloro-m-xylene (TCMX) (Surrogate)	µg/L	-	0.09	0.09	30	1
SE192028.041	LB172310.023		Alpha BHC	µg/L	0.1	<0.1	0	200	0
			Hexachlorobenzene (HCB)	µg/L	0.1	<0.1	0	200	0
			Beta BHC	µg/L	0.1	<0.1	0	200	0
			Lindane (gamma BHC)	µg/L	0.1	<0.1	0	200	0
			Delta BHC	µg/L	0.1	<0.1	0	200	0
			Heptachlor	µg/L	0.1	<0.1	0	200	0
			Aldrin	µg/L	0.1	<0.1	0	200	0
			Heptachlor epoxide	µg/L	0.1	<0.1	0	200	0
			Gamma Chlordane	µg/L	0.1	<0.1	0	200	0
			Alpha Chlordane	µg/L	0.1	<0.1	0	200	0
			Alpha Endosulfan	µg/L	0.1	<0.1	0	200	0
			o,p'-DDE	µg/L	0.1	<0.1	0	200	0
			p,p'-DDE	µg/L	0.1	<0.1	0	200	0
			Dieldrin	µg/L	0.1	<0.1	0	200	0

Duplicates are calculated as Relative Percentage Difference (RPD) using the formula: RPD = | OriginalResult - ReplicateResult | x 100 / Mean

The RPD is evaluated against the Maximum Allowable Difference (MAD) criteria and can be graphically represented by a curve calculated from the Statistical Detection Limit (SDL) and Limiting Repeatability (LR) using the formula: MAD = 100 x SDL / Mean + LR

Where the Maximum Allowable Difference evaluates to a number larger than 200 it is displayed as 200.

RPD is shown in **Green** when within suggested criteria or **Red** with an appended reason identifer when outside suggested criteria. Refer to the footnotes section at the end of this report for failure reasons.

OC Pesticides in Water (continued)

Method: ME-(AU)-[ENV]AN420

Original	Duplicate		Parameter	Units	LOR	Original	Duplicate	Criteria %	RPD %
SE192028.041	LB172310.023		Endrin	µg/L	0.1	<0.1	0	200	0
			Beta Endosulfan	µg/L	0.1	<0.1	0	200	0
			o,p'-DDD	µg/L	0.1	<0.1	0	200	0
			p,p'-DDD	µg/L	0.1	<0.1	0	200	0
			Endosulfan sulphate	µg/L	0.1	<0.1	0	200	0
			o,p'-DDT	µg/L	0.1	<0.1	0	200	0
			p,p'-DDT	µg/L	0.1	<0.1	0	200	0
			Endrin ketone	µg/L	0.1	<0.1	0	200	0
			Methoxychlor	µg/L	0.1	<0.1	0	200	0
			trans-Nonachlor	µg/L	0.1	<0.1	0	200	0
			Endrin aldehyde	µg/L	0.1	<0.1	0	200	0
			Isodrin	µg/L	0.1	<0.1	0	200	0
			Mirex	µg/L	0.1	<0.1	0	200	0
		Surrogates	Tetrachloro-m-xylene (TCMX) (Surrogate)	µg/L	-	0.11	0.099	30	12

OP Pesticides in Soil

Method: ME-(AU)-[ENV]AN420

Original	Duplicate		Parameter	Units	LOR	Original	Duplicate	Criteria %	RPD %
SE192028.018	LB172299.027		Dichlorvos	mg/kg	0.5	<0.5	0.01	200	0
			Dimethoate	mg/kg	0.5	<0.5	0.01	200	0
			Diazinon (Dimpylate)	mg/kg	0.5	<0.5	0	200	0
			Fenitrothion	mg/kg	0.2	<0.2	0	200	0
			Malathion	mg/kg	0.2	<0.2	0	200	0
			Chlorpyrifos (Chlorpyrifos Ethyl)	mg/kg	0.2	<0.2	0	200	0
			Parathion-ethyl (Parathion)	mg/kg	0.2	<0.2	0.03	200	0
			Bromophos Ethyl	mg/kg	0.2	<0.2	0.01	200	0
			Methidathion	mg/kg	0.5	<0.5	0	200	0
			Ethion	mg/kg	0.2	<0.2	0	200	0
			Azinphos-methyl (Guthion)	mg/kg	0.2	<0.2	0	200	0
			Total OP Pesticides*	mg/kg	1.7	<1.7	0	200	0
		Surrogates	2-fluorobiphenyl (Surrogate)	mg/kg	-	0.5	0.45	30	9
			d14-p-terphenyl (Surrogate)	mg/kg	-	0.5	0.48	30	12
SE192028.029	LB172300.024		Dichlorvos	mg/kg	0.5	<0.5	0.04	200	0
			Dimethoate	mg/kg	0.5	<0.5	0	200	0
			Diazinon (Dimpylate)	mg/kg	0.5	<0.5	0	200	0
			Fenitrothion	mg/kg	0.2	<0.2	0	200	0
			Malathion	mg/kg	0.2	<0.2	0.02	200	0
			Chlorpyrifos (Chlorpyrifos Ethyl)	mg/kg	0.2	<0.2	0	200	0
			Parathion-ethyl (Parathion)	mg/kg	0.2	<0.2	0.02	200	0
			Bromophos Ethyl	mg/kg	0.2	<0.2	0.01	200	0
			Methidathion	mg/kg	0.5	<0.5	0	200	0
			Ethion	mg/kg	0.2	<0.2	0	200	0
			Azinphos-methyl (Guthion)	mg/kg	0.2	<0.2	0	200	0
			Total OP Pesticides*	mg/kg	1.7	<1.7	0	200	0
		Surrogates	2-fluorobiphenyl (Surrogate)	mg/kg	-	0.5	0.45	30	2
			d14-p-terphenyl (Surrogate)	mg/kg	-	0.5	0.51	30	0

OP Pesticides in Water

Method: ME-(AU)-[ENV]AN420

Original	Duplicate		Parameter	Units	LOR	Original	Duplicate	Criteria %	RPD %
SE192028.041	LB172310.023		Dichlorvos	µg/L	0.5	<0.5	0	200	0
			Dimethoate	µg/L	0.5	<0.5	0	200	0
			Diazinon (Dimpylate)	µg/L	0.5	<0.5	0	200	0
			Fenitrothion	µg/L	0.2	<0.2	0	200	0
			Malathion	µg/L	0.2	<0.2	0	200	0
			Chlorpyrifos (Chlorpyrifos Ethyl)	µg/L	0.2	<0.2	0	200	0
			Parathion-ethyl (Parathion)	µg/L	0.2	<0.2	0	200	0
			Bromophos Ethyl	µg/L	0.2	<0.2	0	200	0
			Methidathion	µg/L	0.5	<0.5	0	200	0
			Ethion	µg/L	0.2	<0.2	0	200	0
			Azinphos-methyl	µg/L	0.2	<0.2	0	200	0
		Surrogates	2-fluorobiphenyl (Surrogate)	µg/L	-	0.3	0.28	30	0
			d14-p-terphenyl (Surrogate)	µg/L	-	0.4	0.41	30	16

DUPLICATES

Duplicates are calculated as Relative Percentage Difference (RPD) using the formula: RPD = | OriginalResult - ReplicateResult | x 100 / Mean

The RPD is evaluated against the Maximum Allowable Difference (MAD) criteria and can be graphically represented by a curve calculated from the Statistical Detection Limit (SDL) and Limiting Repeatability (LR) using the formula: MAD = 100 x SDL / Mean + LR

Where the Maximum Allowable Difference evaluates to a number larger than 200 it is displayed as 200.

RPD is shown in **Green** when within suggested criteria or **Red** with an appended reason identifer when outside suggested criteria. Refer to the footnotes section at the end of this report for failure reasons.

PAH (Polynuclear Aromatic Hydrocarbons) in Soil

Method: ME-(AU)-[ENV]AN420

Original	Duplicate		Parameter	Units	LOR	Original	Duplicate	Criteria %	RPD %
SE192028.018	LB172299.027		Naphthalene	mg/kg	0.1	<0.1	0	200	0
			2-methylnaphthalene	mg/kg	0.1	<0.1	0	200	0
			1-methylnaphthalene	mg/kg	0.1	<0.1	0	200	0
			Acenaphthylene	mg/kg	0.1	<0.1	0	200	0
			Acenaphthene	mg/kg	0.1	<0.1	0	200	0
			Fluorene	mg/kg	0.1	<0.1	0	200	0
			Phenanthrene	mg/kg	0.1	<0.1	0	200	0
			Anthracene	mg/kg	0.1	<0.1	0	200	0
			Fluoranthene	mg/kg	0.1	<0.1	0	200	0
			Pyrene	mg/kg	0.1	<0.1	0	200	0
			Benzo(a)anthracene	mg/kg	0.1	<0.1	0.01	200	0
			Chrysene	mg/kg	0.1	<0.1	0.01	200	0
			Benzo(b&j)fluoranthene	mg/kg	0.1	<0.1	0	200	0
			Benzo(k)fluoranthene	mg/kg	0.1	<0.1	0	200	0
			Benzo(a)pyrene	mg/kg	0.1	<0.1	0	200	0
			Indeno(1,2,3-cd)pyrene	mg/kg	0.1	<0.1	0	200	0
			Dibenzo(ah)anthracene	mg/kg	0.1	<0.1	0	200	0
			Benzo(ghi)perylene	mg/kg	0.1	<0.1	0	200	0
			Carcinogenic PAHs, BaP TEQ <LOR=0	mg/kg	0.2	<0.2	0	200	0
				TEQ (mg/kg)	0.2	<0.2	0	200	0
			Carcinogenic PAHs, BaP TEQ <LOR=LOR	mg/kg	0.3	<0.3	0.242	134	0
				TEQ (mg/kg)	0.3	<0.3	0.242	134	0
			Carcinogenic PAHs, BaP TEQ <LOR=LOR/2	mg/kg	0.2	<0.2	0.121	175	0
				TEQ (mg/kg)	0.2	<0.2	0.121	175	0
			Total PAH (18)	mg/kg	0.8	<0.8	0	200	0
		Surrogates	d5-nitrobenzene (Surrogate)	mg/kg	-	0.5	0.48	30	4
			2-fluorobiphenyl (Surrogate)	mg/kg	-	0.5	0.45	30	9
			d14-p-terphenyl (Surrogate)	mg/kg	-	0.5	0.48	30	12
SE192028.029	LB172300.024		Naphthalene	mg/kg	0.1	<0.1	0	200	0
			2-methylnaphthalene	mg/kg	0.1	<0.1	0	200	0
			1-methylnaphthalene	mg/kg	0.1	<0.1	0	200	0
			Acenaphthylene	mg/kg	0.1	<0.1	0	200	0
			Acenaphthene	mg/kg	0.1	<0.1	0	200	0
			Fluorene	mg/kg	0.1	<0.1	0	200	0
			Phenanthrene	mg/kg	0.1	<0.1	0.01	200	0
			Anthracene	mg/kg	0.1	<0.1	0.01	200	0
			Fluoranthene	mg/kg	0.1	<0.1	0.04	200	0
			Pyrene	mg/kg	0.1	<0.1	0.03	200	0
			Benzo(a)anthracene	mg/kg	0.1	<0.1	0.02	200	0
			Chrysene	mg/kg	0.1	<0.1	0.02	200	0
			Benzo(b&j)fluoranthene	mg/kg	0.1	<0.1	0.03	200	0
			Benzo(k)fluoranthene	mg/kg	0.1	<0.1	0.03	200	0
			Benzo(a)pyrene	mg/kg	0.1	<0.1	0.01	200	0
			Indeno(1,2,3-cd)pyrene	mg/kg	0.1	<0.1	0.02	200	0
			Dibenzo(ah)anthracene	mg/kg	0.1	<0.1	0	200	0
			Benzo(ghi)perylene	mg/kg	0.1	<0.1	0.02	200	0
			Carcinogenic PAHs, BaP TEQ <LOR=0	mg/kg	0.2	<0.2	0	200	0
			Carcinogenic PAHs, BaP TEQ <LOR=LOR	mg/kg	0.3	<0.3	0.242	134	0
			Carcinogenic PAHs, BaP TEQ <LOR=LOR/2	mg/kg	0.2	<0.2	0.121	175	0
			Total PAH (18)	mg/kg	0.8	<0.8	0	200	0
		Surrogates	d5-nitrobenzene (Surrogate)	mg/kg	-	0.5	0.51	30	0
			2-fluorobiphenyl (Surrogate)	mg/kg	-	0.5	0.45	30	2
			d14-p-terphenyl (Surrogate)	mg/kg	-	0.5	0.51	30	0

PAH (Polynuclear Aromatic Hydrocarbons) in Water

Method: ME-(AU)-[ENV]AN420

Original	Duplicate	Parameter	Units	LOR	Original	Duplicate	Criteria %	RPD %
SE192028.041	LB172310.023	Naphthalene	μg/L	0.1	<0.1	0	200	0
		2-methylnaphthalene	μg/L	0.1	<0.1	0	200	0
		1-methylnaphthalene	μg/L	0.1	<0.1	0	200	0
		Acenaphthylene	μg/L	0.1	<0.1	0	200	0
		Acenaphthene	μg/L	0.1	<0.1	0	200	0

Duplicates are calculated as Relative Percentage Difference (RPD) using the formula: RPD = | OriginalResult - ReplicateResult | x 100 / Mean

The RPD is evaluated against the Maximum Allowable Difference (MAD) criteria and can be graphically represented by a curve calculated from the Statistical Detection Limit (SDL) and Limiting Repeatability (LR) using the formula: MAD = 100 x SDL / Mean + LR

Where the Maximum Allowable Difference evaluates to a number larger than 200 it is displayed as 200.

RPD is shown in **Green** when within suggested criteria or **Red** with an appended reason identifer when outside suggested criteria. Refer to the footnotes section at the end of this report for failure reasons.

PAH (Polynuclear Aromatic Hydrocarbons) in Water (continued)

Method: ME-(AU)-[ENV]AN420

Original	Duplicate		Parameter	Units	LOR	Original	Duplicate	Criteria %	RPD %
SE192028.041	LB172310.023		Fluorene	µg/L	0.1	<0.1	0	200	0
			Phenanthrene	µg/L	0.1	<0.1	0	200	0
			Anthracene	µg/L	0.1	<0.1	0	200	0
			Fluoranthene	µg/L	0.1	<0.1	0	200	0
			Pyrene	µg/L	0.1	<0.1	0	200	0
			Benzo(a)anthracene	µg/L	0.1	<0.1	0	200	0
			Chrysene	µg/L	0.1	<0.1	0	200	0
			Benzo(b&j)fluoranthene	µg/L	0.1	<0.1	0	200	0
			Benzo(k)fluoranthene	µg/L	0.1	<0.1	0	200	0
			Benzo(a)pyrene	µg/L	0.1	<0.1	0	200	0
			Indeno(1,2,3-cd)pyrene	µg/L	0.1	<0.1	0	200	0
			Dibenzo(ah)anthracene	µg/L	0.1	<0.1	0	200	0
			Benzo(ghi)perylene	µg/L	0.1	<0.1	0	200	0
		Surrogates	d5-nitrobenzene (Surrogate)	µg/L	-	0.3	0.27	30	4
			2-fluorobiphenyl (Surrogate)	µg/L	-	0.3	0.28	30	0
			d14-p-terphenyl (Surrogate)	µg/L	-	0.4	0.41	30	16

PCBs in Soil

Method: ME-(AU)-[ENV]AN420

Original	Duplicate		Parameter	Units	LOR	Original	Duplicate	Criteria %	RPD %
SE192028.011	LB172299.027		Arochlor 1016	mg/kg	0.2	<0.2	0	200	0
			Arochlor 1221	mg/kg	0.2	<0.2	0	200	0
			Arochlor 1232	mg/kg	0.2	<0.2	0	200	0
			Arochlor 1242	mg/kg	0.2	<0.2	0	200	0
			Arochlor 1248	mg/kg	0.2	<0.2	0	200	0
			Arochlor 1254	mg/kg	0.2	<0.2	0	200	0
			Arochlor 1260	mg/kg	0.2	<0.2	0	200	0
			Arochlor 1262	mg/kg	0.2	<0.2	0	200	0
			Arochlor 1268	mg/kg	0.2	<0.2	0	200	0
			Total PCBs (Arochlors)	mg/kg	1	<1	0	200	0
		Surrogates	Tetrachloro-m-xylene (TCMX) (Surrogate)	mg/kg	-	0	0.161	30	2
SE192028.029	LB172300.023		Arochlor 1016	mg/kg	0.2	<0.2	0	200	0
			Arochlor 1221	mg/kg	0.2	<0.2	0	200	0
			Arochlor 1232	mg/kg	0.2	<0.2	0	200	0
			Arochlor 1242	mg/kg	0.2	<0.2	0	200	0
			Arochlor 1248	mg/kg	0.2	<0.2	0	200	0
			Arochlor 1254	mg/kg	0.2	<0.2	0	200	0
			Arochlor 1260	mg/kg	0.2	<0.2	0	200	0
			Arochlor 1262	mg/kg	0.2	<0.2	0	200	0
			Arochlor 1268	mg/kg	0.2	<0.2	0	200	0
			Total PCBs (Arochlors)	mg/kg	1	<1	0	200	0
		Surrogates	Tetrachloro-m-xylene (TCMX) (Surrogate)	mg/kg	-	0	0.148	30	0

PCBs in Water

Method: ME-(AU)-[ENV]AN420

Original	Duplicate		Parameter	Units	LOR	Original	Duplicate	Criteria %	RPD %
SE192028.041	LB172310.023		Arochlor 1016	µg/L	1	<1	0	200	0
			Arochlor 1221	µg/L	1	<1	0	200	0
			Arochlor 1232	µg/L	1	<1	0	200	0
			Arochlor 1242	µg/L	1	<1	0	200	0
			Arochlor 1248	µg/L	1	<1	0	200	0
			Arochlor 1254	µg/L	1	<1	0	200	0
			Arochlor 1260	µg/L	1	<1	0	200	0
			Arochlor 1262	µg/L	1	<1	0	200	0
			Arochlor 1268	µg/L	1	<1	0	200	0
		Surrogates	Tetrachloro-m-xylene (Surrogate)	µg/L	-	0.1	0.099	30	12

Total Recoverable Elements in Soil/Waste Solids/Materials by ICPOES

Method: ME-(AU)-[ENV]AN040/AN320

Original	Duplicate		Parameter	Units	LOR	Original	Duplicate	Criteria %	RPD %
SE192028.010	LB172303.014		Arsenic, As	mg/kg	1	4	3	57	17
			Cadmium, Cd	mg/kg	0.3	<0.3	<0.3	200	0
			Chromium, Cr	mg/kg	0.3	46	42	31	8
			Copper, Cu	mg/kg	0.5	79	49	31	46 ②
			Nickel, Ni	mg/kg	0.5	67	50	31	29

Duplicates are calculated as Relative Percentage Difference (RPD) using the formula: RPD = | OriginalResult - ReplicateResult | x 100 / Mean

The RPD is evaluated against the Maximum Allowable Difference (MAD) criteria and can be graphically represented by a curve calculated from the Statistical Detection Limit (SDL) and Limiting Repeatability (LR) using the formula: MAD = 100 x SDL / Mean + LR

Where the Maximum Allowable Difference evaluates to a number larger than 200 it is displayed as 200.

RPD is shown in **Green** when within suggested criteria or **Red** with an appended reason identifer when outside suggested criteria. Refer to the footnotes section at the end of this report for failure reasons.

Total Recoverable Elements in Soil/Waste Solids/Materials by ICPOES (continued)

Method: ME-(AU)-[ENV]AN040/AN320

Original	Duplicate	Parameter	Units	LOR	Original	Duplicate	Criteria %	RPD %
SE192028.010	LB172303.014	Lead, Pb	mg/kg	1	18	13	37	33
		Zinc, Zn	mg/kg	2	54	50	34	9
SE192028.019	LB172303.024	Arsenic, As	mg/kg	1	13	8	40	55 ②
		Cadmium, Cd	mg/kg	0.3	<0.3	0.3	127	8
		Chromium, Cr	mg/kg	0.3	53	61	31	14
		Copper, Cu	mg/kg	0.5	32	36	31	11
		Nickel, Ni	mg/kg	0.5	51	62	31	20
		Lead, Pb	mg/kg	1	16	13	37	20
		Zinc, Zn	mg/kg	2	63	67	33	5
SE192028.029	LB172304.014	Arsenic, As	mg/kg	1	2	5	60	95 ②
		Cadmium, Cd	mg/kg	0.3	<0.3	<0.3	200	0
		Chromium, Cr	mg/kg	0.3	59	49	31	18
		Copper, Cu	mg/kg	0.5	41	37	31	11
		Nickel, Ni	mg/kg	0.5	110	120	30	15
		Lead, Pb	mg/kg	1	8	6	44	29
		Zinc, Zn	mg/kg	2	44	38	35	15
SE192028.037	LB172304.023	Arsenic, As	mg/kg	1	5	3	56	55
		Cadmium, Cd	mg/kg	0.3	<0.3	<0.3	200	0
		Chromium, Cr	mg/kg	0.3	72	70	31	3
		Copper, Cu	mg/kg	0.5	39	38	31	4
		Nickel, Ni	mg/kg	0.5	68	70	31	3
		Lead, Pb	mg/kg	1	170	130	31	23
		Zinc, Zn	mg/kg	2	70	66	33	6

Trace Metals (Dissolved) in Water by ICPMS

Method: ME-(AU)-[ENV]AN318

Original	Duplicate	Parameter	Units	LOR	Original	Duplicate	Criteria %	RPD %
SE192028.041	LB172364.018	Arsenic, As	μg/L	1	<1	<1	200	0
		Cadmium, Cd	μg/L	0.1	<0.1	<0.1	200	0
		Chromium, Cr	μg/L	1	<1	<1	157	0
		Copper, Cu	μg/L	1	<1	<1	200	0
		Lead, Pb	μg/L	1	<1	<1	200	0
		Nickel, Ni	μg/L	1	<1	<1	200	0
		Zinc, Zn	μg/L	5	<5	<5	200	0

TRH (Total Recoverable Hydrocarbons) in Soil

Method: ME-(AU)-[ENV]AN403

Original	Duplicate		Parameter	Units	LOR	Original	Duplicate	Criteria %	RPD %
SE192028.011	LB172299.027		TRH C10-C14	mg/kg	20	<20	0	200	0
			TRH C15-C28	mg/kg	45	<45	0	200	0
			TRH C29-C36	mg/kg	45	<45	0	200	0
			TRH C37-C40	mg/kg	100	<100	0	200	0
			TRH C10-C36 Total	mg/kg	110	<110	0	200	0
			TRH C10-C40 Total (F bands)	mg/kg	210	<210	0	200	0
		TRH F Bands	TRH >C10-C16	mg/kg	25	<25	0	200	0
			TRH >C10-C16 - Naphthalene (F2)	mg/kg	25	<25	0	200	0
			TRH >C16-C34 (F3)	mg/kg	90	<90	0	200	0
			TRH >C34-C40 (F4)	mg/kg	120	<120	0	200	0
SE192028.018	LB172299.028		TRH C10-C14	mg/kg	20	<20	0	200	0
			TRH C15-C28	mg/kg	45	<45	0	200	0
			TRH C29-C36	mg/kg	45	<45	0	200	0
			TRH C37-C40	mg/kg	100	<100	0	200	0
			TRH C10-C36 Total	mg/kg	110	<110	0	200	0
			TRH C10-C40 Total (F bands)	mg/kg	210	<210	0	200	0
		TRH F Bands	TRH >C10-C16	mg/kg	25	<25	0	200	0
			TRH >C10-C16 - Naphthalene (F2)	mg/kg	25	<25	0	200	0
			TRH >C16-C34 (F3)	mg/kg	90	<90	0	200	0
			TRH >C34-C40 (F4)	mg/kg	120	<120	0	200	0
SE192028.029	LB172300.024		TRH C10-C14	mg/kg	20	<20	0	200	0
			TRH C15-C28	mg/kg	45	<45	0	200	0
			TRH C29-C36	mg/kg	45	<45	0	200	0
			TRH C37-C40	mg/kg	100	<100	0	200	0
			TRH C10-C36 Total	mg/kg	110	<110	0	200	0
			TRH C10-C40 Total (F bands)	mg/kg	210	<210	0	200	0

Duplicates are calculated as Relative Percentage Difference (RPD) using the formula: RPD = | OriginalResult - ReplicateResult | x 100 / Mean

The RPD is evaluated against the Maximum Allowable Difference (MAD) criteria and can be graphically represented by a curve calculated from the Statistical Detection Limit (SDL) and Limiting Repeatability (LR) using the formula: MAD = 100 x SDL / Mean + LR

Where the Maximum Allowable Difference evaluates to a number larger than 200 it is displayed as 200.

RPD is shown in **Green** when within suggested criteria or **Red** with an appended reason identifer when outside suggested criteria. Refer to the footnotes section at the end of this report for failure reasons.

TRH (Total Recoverable Hydrocarbons) in Soil (continued)

Method: ME-(AU)-[ENV]AN403

Original	Duplicate		Parameter	Units	LOR	Original	Duplicate	Criteria %	RPD %
SE192028.029	LB172300.024	TRH F Bands	TRH >C10-C16	mg/kg	25	<25	0	200	0
			TRH >C10-C16 - Naphthalene (F2)	mg/kg	25	<25	0	200	0
			TRH >C16-C34 (F3)	mg/kg	90	<90	0	200	0
			TRH >C34-C40 (F4)	mg/kg	120	<120	0	200	0
SE192028.034	LB172300.025		TRH C10-C14	mg/kg	20	<20	0	200	0
			TRH C15-C28	mg/kg	45	<45	0	200	0
			TRH C29-C36	mg/kg	45	<45	0	200	0
			TRH C37-C40	mg/kg	100	<100	0	200	0
			TRH C10-C36 Total	mg/kg	110	<110	0	200	0
			TRH C10-C40 Total (F bands)	mg/kg	210	<210	0	200	0
		TRH F Bands	TRH >C10-C16	mg/kg	25	<25	0	200	0
			TRH >C10-C16 - Naphthalene (F2)	mg/kg	25	<25	0	200	0
			TRH >C16-C34 (F3)	mg/kg	90	<90	0	200	0
			TRH >C34-C40 (F4)	mg/kg	120	<120	0	200	0

TRH (Total Recoverable Hydrocarbons) in Water

Method: ME-(AU)-[ENV]AN403

Original	Duplicate		Parameter	Units	LOR	Original	Duplicate	Criteria %	RPD %
SE192028.041	LB172310.023		TRH C10-C14	µg/L	50	<50	0	200	0
			TRH C15-C28	µg/L	200	<200	0	200	0
			TRH C29-C36	µg/L	200	<200	0	200	0
			TRH C37-C40	µg/L	200	<200	0	200	0
			TRH C10-C36	µg/L	450	<450	0	200	0
			TRH C10-C40	µg/L	650	<650	0	200	0
		TRH F Bands	TRH >C10-C16	µg/L	60	<60	0	200	0
			TRH >C10-C16 - Naphthalene (F2)	µg/L	60	<60	0	200	0
			TRH >C16-C34 (F3)	µg/L	500	<500	0	200	0
			TRH >C34-C40 (F4)	µg/L	500	<500	0	200	0

VOC's in Soil

Method: ME-(AU)-[ENV]AN433

Original	Duplicate		Parameter	Units	LOR	Original	Duplicate	Criteria %	RPD %
SE192028.010	LB172297.014	Monocyclic Aromatic	Benzene	mg/kg	0.1	<0.1	<0.1	200	0
			Toluene	mg/kg	0.1	<0.1	<0.1	200	0
			Ethylbenzene	mg/kg	0.1	<0.1	<0.1	200	0
			m/p-xylene	mg/kg	0.2	<0.2	<0.2	200	0
			o-xylene	mg/kg	0.1	<0.1	<0.1	200	0
		Polycyclic	Naphthalene	mg/kg	0.1	<0.1	<0.1	200	0
		Surrogates	Dibromofluoromethane (Surrogate)	mg/kg	-	5.2	5.2	50	0
			d4-1,2-dichloroethane (Surrogate)	mg/kg	-	5.3	5.3	50	0
			d8-toluene (Surrogate)	mg/kg	-	3.9	3.8	50	1
			Bromofluorobenzene (Surrogate)	mg/kg	-	3.8	3.8	50	0
		Totals	Total Xylenes	mg/kg	0.3	<0.3	<0.3	200	0
			Total BTEX	mg/kg	0.6	<0.6	<0.6	200	0
SE192028.020	LB172297.025	Monocyclic Aromatic	Benzene	mg/kg	0.1	<0.1	<0.1	200	0
			Toluene	mg/kg	0.1	<0.1	<0.1	200	0
			Ethylbenzene	mg/kg	0.1	<0.1	<0.1	200	0
			m/p-xylene	mg/kg	0.2	<0.2	<0.2	200	0
			o-xylene	mg/kg	0.1	<0.1	<0.1	200	0
		Polycyclic	Naphthalene	mg/kg	0.1	<0.1	<0.1	200	0
		Surrogates	Dibromofluoromethane (Surrogate)	mg/kg	-	4.0	3.8	50	5
			d4-1,2-dichloroethane (Surrogate)	mg/kg	-	4.4	4.2	50	5
			d8-toluene (Surrogate)	mg/kg	-	3.9	3.6	50	7
			Bromofluorobenzene (Surrogate)	mg/kg	-	3.9	3.8	50	3
		Totals	Total Xylenes	mg/kg	0.3	<0.3	<0.3	200	0
			Total BTEX	mg/kg	0.6	<0.6	<0.6	200	0
SE192028.030	LB172298.014	Monocyclic Aromatic	Benzene	mg/kg	0.1	<0.1	<0.1	200	0
			Toluene	mg/kg	0.1	<0.1	<0.1	200	0
			Ethylbenzene	mg/kg	0.1	<0.1	<0.1	200	0
			m/p-xylene	mg/kg	0.2	<0.2	<0.2	200	0
			o-xylene	mg/kg	0.1	<0.1	<0.1	200	0
		Polycyclic	Naphthalene	mg/kg	0.1	<0.1	<0.1	200	0
		Surrogates	Dibromofluoromethane (Surrogate)	mg/kg	-	3.6	3.5	50	1
			d4-1,2-dichloroethane (Surrogate)	mg/kg	-	3.8	3.6	50	3

Duplicates are calculated as Relative Percentage Difference (RPD) using the formula: RPD = | OriginalResult - ReplicateResult | x 100 / Mean

The RPD is evaluated against the Maximum Allowable Difference (MAD) criteria and can be graphically represented by a curve calculated from the Statistical Detection Limit (SDL) and Limiting Repeatability (LR) using the formula: MAD = 100 x SDL / Mean + LR

Where the Maximum Allowable Difference evaluates to a number larger than 200 it is displayed as 200.

RPD is shown in **Green** when within suggested criteria or **Red** with an appended reason identifer when outside suggested criteria. Refer to the footnotes section at the end of this report for failure reasons.

VOC's in Soil (continued)

Method: ME-(AU)-[ENV]AN433

Original	Duplicate		Parameter	Units	LOR	Original	Duplicate	Criteria %	RPD %
SE192028.030	LB172298.014	Surrogates	d8-toluene (Surrogate)	mg/kg	-	3.8	3.8	50	0
			Bromofluorobenzene (Surrogate)	mg/kg	-	3.7	3.8	50	4
		Totals	Total Xylenes	mg/kg	0.3	<0.3	<0.3	200	0
			Total BTEX	mg/kg	0.6	<0.6	<0.6	200	0
SE192028.037	LB172298.025	Monocyclic Aromatic	Benzene	mg/kg	0.1	<0.1	0	200	0
			Toluene	mg/kg	0.1	<0.1	0.0037653678	200	0
			Ethylbenzene	mg/kg	0.1	<0.1	0.0008090278	200	0
			m/p-xylene	mg/kg	0.2	<0.2	0.0086367841	200	0
			o-xylene	mg/kg	0.1	<0.1	0.0006013262	200	0
		Polycyclic	Naphthalene	mg/kg	0.1	<0.1	0	200	0
		Surrogates	Dibromofluoromethane (Surrogate)	mg/kg	-	4.0	3.8491764233	50	4
			d4-1,2-dichloroethane (Surrogate)	mg/kg	-	4.0	3.7692208309	50	6
			d8-toluene (Surrogate)	mg/kg	-	3.7	3.6963397556	50	1
			Bromofluorobenzene (Surrogate)	mg/kg	-	3.7	3.8758956603	50	3
		Totals	Total Xylenes	mg/kg	0.3	<0.3	0.0092381103	200	0
			Total BTEX	mg/kg	0.6	<0.6	0.0138125060	200	0

Volatile Petroleum Hydrocarbons in Soil

Method: ME-(AU)-[ENV]AN433

Original	Duplicate		Parameter	Units	LOR	Original	Duplicate	Criteria %	RPD %
SE192028.010	LB172297.014		TRH C6-C10	mg/kg	25	<25	<25	200	0
			TRH C6-C9	mg/kg	20	<20	<20	200	0
		Surrogates	Dibromofluoromethane (Surrogate)	mg/kg	-	5.2	5.2	30	0
			d4-1,2-dichloroethane (Surrogate)	mg/kg	-	5.3	5.3	30	0
			d8-toluene (Surrogate)	mg/kg	-	3.9	3.8	30	1
			Bromofluorobenzene (Surrogate)	mg/kg	-	3.8	3.8	30	0
		VPH F Bands	Benzene (F0)	mg/kg	0.1	<0.1	<0.1	200	0
			TRH C6-C10 minus BTEX (F1)	mg/kg	25	<25	<25	200	0
SE192028.020	LB172297.025		TRH C6-C10	mg/kg	25	<25	<25	200	0
			TRH C6-C9	mg/kg	20	<20	<20	200	0
		Surrogates	Dibromofluoromethane (Surrogate)	mg/kg	-	4.0	3.8	30	5
			d4-1,2-dichloroethane (Surrogate)	mg/kg	-	4.4	4.2	30	5
			d8-toluene (Surrogate)	mg/kg	-	3.9	3.6	30	7
			Bromofluorobenzene (Surrogate)	mg/kg	-	3.9	3.8	30	3
		VPH F Bands	Benzene (F0)	mg/kg	0.1	<0.1	<0.1	200	0
			TRH C6-C10 minus BTEX (F1)	mg/kg	25	<25	<25	200	0
SE192028.030	LB172298.014		TRH C6-C10	mg/kg	25	<25	<25	200	0
			TRH C6-C9	mg/kg	20	<20	<20	200	0
		Surrogates	Dibromofluoromethane (Surrogate)	mg/kg	-	3.6	3.5	30	1
			d4-1,2-dichloroethane (Surrogate)	mg/kg	-	3.8	3.6	30	3
			d8-toluene (Surrogate)	mg/kg	-	3.8	3.8	30	0
			Bromofluorobenzene (Surrogate)	mg/kg	-	3.7	3.8	30	4
		VPH F Bands	Benzene (F0)	mg/kg	0.1	<0.1	<0.1	200	0
			TRH C6-C10 minus BTEX (F1)	mg/kg	25	<25	<25	200	0
SE192028.037	LB172298.025		TRH C6-C10	mg/kg	25	<25	0	200	0
			TRH C6-C9	mg/kg	20	<20	0	200	0
		Surrogates	Dibromofluoromethane (Surrogate)	mg/kg	-	4.0	3.8491764233	30	4
			d4-1,2-dichloroethane (Surrogate)	mg/kg	-	4.0	3.7692208309	30	6
			d8-toluene (Surrogate)	mg/kg	-	3.7	3.6963397556	30	1
			Bromofluorobenzene (Surrogate)	mg/kg	-	3.7	3.8758956603	30	3
		VPH F Bands	Benzene (F0)	mg/kg	0.1	<0.1	0	200	0
			TRH C6-C10 minus BTEX (F1)	mg/kg	25	<25	-0.0138125060	200	0

Laboratory Control Standard (LCS) results are evaluated against an expected result, typically the concentration of analyte spiked into the control during the sample preparation stage, producing a percentage recovery. The criteria applied to the percentage recovery is established in the SGS QA /QC plan (Ref: MP-(AU)-[ENV]QU-022). For more information refer to the footnotes in the concluding page of this report.

Recovery is shown in **Green** when within suggested criteria or **Red** with an appended dagger symbol (†) when outside suggested criteria.

Mercury in Soil

Method: ME-(AU)-[ENV]AN312

Sample Number	Parameter	Units	LOR	Result	Expected	Criteria %	Recovery %
LB172303.002	Mercury	mg/kg	0.05	0.24	0.2	70 - 130	120
LB172305.002	Mercury	mg/kg	0.05	0.22	0.2	70 - 130	110

OC Pesticides in Soil

Method: ME-(AU)-[ENV]AN420

Sample Number		Parameter	Units	LOR	Result	Expected	Criteria %	Recovery %
LB172299.002		Heptachlor	mg/kg	0.1	0.2	0.2	60 - 140	94
		Aldrin	mg/kg	0.1	0.2	0.2	60 - 140	99
		Delta BHC	mg/kg	0.1	0.2	0.2	60 - 140	92
		Dieldrin	mg/kg	0.2	<0.2	0.2	60 - 140	90
		Endrin	mg/kg	0.2	<0.2	0.2	60 - 140	89
		p,p'-DDT	mg/kg	0.1	0.2	0.2	60 - 140	77
	Surrogates	Tetrachloro-m-xylene (TCMX) (Surrogate)	mg/kg	-	0.18	0.15	40 - 130	123
LB172300.002		Heptachlor	mg/kg	0.1	0.2	0.2	60 - 140	83
		Aldrin	mg/kg	0.1	0.2	0.2	60 - 140	88
		Delta BHC	mg/kg	0.1	0.2	0.2	60 - 140	83
		Dieldrin	mg/kg	0.2	<0.2	0.2	60 - 140	88
		Endrin	mg/kg	0.2	<0.2	0.2	60 - 140	83
		p,p'-DDT	mg/kg	0.1	0.2	0.2	60 - 140	78
	Surrogates	Tetrachloro-m-xylene (TCMX) (Surrogate)	mg/kg	-	0.17	0.15	40 - 130	111

OC Pesticides in Water

Method: ME-(AU)-[ENV]AN420

Sample Number		Parameter	Units	LOR	Result	Expected	Criteria %	Recovery %
LB172310.002		Delta BHC	µg/L	0.1	0.2	0.2	60 - 140	100
		Heptachlor	µg/L	0.1	0.2	0.2	60 - 140	87
		Aldrin	µg/L	0.1	0.2	0.2	60 - 140	82
		Dieldrin	µg/L	0.1	0.2	0.2	60 - 140	107
		Endrin	µg/L	0.1	0.2	0.2	60 - 140	101
		p,p'-DDT	µg/L	0.1	0.2	0.2	60 - 140	89
	Surrogates	Tetrachloro-m-xylene (TCMX) (Surrogate)	µg/L	-	0.08	0.15	40 - 130	51

OP Pesticides in Soil

Method: ME-(AU)-[ENV]AN420

Sample Number		Parameter	Units	LOR	Result	Expected	Criteria %	Recovery %
LB172299.002		Dichlorvos	mg/kg	0.5	1.9	2	60 - 140	93
		Diazinon (Dimpylate)	mg/kg	0.5	2.2	2	60 - 140	109
		Chlorpyrifos (Chlorpyrifos Ethyl)	mg/kg	0.2	2.4	2	60 - 140	121
		Ethion	mg/kg	0.2	2.0	2	60 - 140	99
	Surrogates	2-fluorobiphenyl (Surrogate)	mg/kg	-	0.5	0.5	40 - 130	92
		d14-p-terphenyl (Surrogate)	mg/kg	-	0.5	0.5	40 - 130	92
LB172300.002		Dichlorvos	mg/kg	0.5	1.8	2	60 - 140	91
		Diazinon (Dimpylate)	mg/kg	0.5	2.2	2	60 - 140	112
		Chlorpyrifos (Chlorpyrifos Ethyl)	mg/kg	0.2	2.1	2	60 - 140	103
		Ethion	mg/kg	0.2	2.3	2	60 - 140	114
	Surrogates	2-fluorobiphenyl (Surrogate)	mg/kg	-	0.5	0.5	40 - 130	94
		d14-p-terphenyl (Surrogate)	mg/kg	-	0.5	0.5	40 - 130	100

OP Pesticides in Water

Method: ME-(AU)-[ENV]AN420

Sample Number		Parameter	Units	LOR	Result	Expected	Criteria %	Recovery %
LB172310.002		Dichlorvos	µg/L	0.5	8.2	8	60 - 140	103
		Diazinon (Dimpylate)	µg/L	0.5	8.7	8	60 - 140	109
		Chlorpyrifos (Chlorpyrifos Ethyl)	µg/L	0.2	7.9	8	60 - 140	99
		Ethion	µg/L	0.2	8.1	8	60 - 140	101
	Surrogates	2-fluorobiphenyl (Surrogate)	µg/L	-	0.3	0.5	40 - 130	68
		d14-p-terphenyl (Surrogate)	µg/L	-	0.4	0.5	40 - 130	76

PAH (Polynuclear Aromatic Hydrocarbons) in Soil

Method: ME-(AU)-[ENV]AN420

Sample Number	Parameter	Units	LOR	Result	Expected	Criteria %	Recovery %
LB172299.002	Naphthalene	mg/kg	0.1	4.2	4	60 - 140	105
	Acenaphthylene	mg/kg	0.1	4.5	4	60 - 140	111
	Acenaphthene	mg/kg	0.1	4.3	4	60 - 140	108
	Phenanthrene	mg/kg	0.1	4.4	4	60 - 140	109
	Anthracene	mg/kg	0.1	4.1	4	60 - 140	103
	Fluoranthene	mg/kg	0.1	4.1	4	60 - 140	102

Laboratory Control Standard (LCS) results are evaluated against an expected result, typically the concentration of analyte spiked into the control during the sample preparation stage, producing a percentage recovery. The criteria applied to the percentage recovery is established in the SGS QA /QC plan (Ref: MP-(AU)-[ENV]QU-022). For more information refer to the footnotes in the concluding page of this report.

Recovery is shown in **Green** when within suggested criteria or **Red** with an appended dagger symbol (†) when outside suggested criteria.

PAH (Polynuclear Aromatic Hydrocarbons) in Soil (continued)

Method: ME-(AU)-[ENV]AN420

Sample Number		Parameter	Units	LOR	Result	Expected	Criteria %	Recovery %
LB172299.002		Pyrene	mg/kg	0.1	4.3	4	60 - 140	108
		Benzo(a)pyrene	mg/kg	0.1	4.1	4	60 - 140	102
	Surrogates	d5-nitrobenzene (Surrogate)	mg/kg	-	0.5	0.5	40 - 130	98
		2-fluorobiphenyl (Surrogate)	mg/kg	-	0.5	0.5	40 - 130	92
		d14-p-terphenyl (Surrogate)	mg/kg	-	0.5	0.5	40 - 130	92
LB172300.002		Naphthalene	mg/kg	0.1	4.6	4	60 - 140	114
		Acenaphthylene	mg/kg	0.1	4.9	4	60 - 140	123
		Acenaphthene	mg/kg	0.1	4.7	4	60 - 140	118
		Phenanthrene	mg/kg	0.1	4.9	4	60 - 140	121
		Anthracene	mg/kg	0.1	4.6	4	60 - 140	116
		Fluoranthene	mg/kg	0.1	4.7	4	60 - 140	118
		Pyrene	mg/kg	0.1	4.8	4	60 - 140	121
		Benzo(a)pyrene	mg/kg	0.1	4.7	4	60 - 140	118
	Surrogates	d5-nitrobenzene (Surrogate)	mg/kg	-	0.5	0.5	40 - 130	102
		2-fluorobiphenyl (Surrogate)	mg/kg	-	0.5	0.5	40 - 130	94
		d14-p-terphenyl (Surrogate)	mg/kg	-	0.5	0.5	40 - 130	100

PAH (Polynuclear Aromatic Hydrocarbons) in Water

Method: ME-(AU)-[ENV]AN420

Sample Number		Parameter	Units	LOR	Result	Expected	Criteria %	Recovery %
LB172310.002		Naphthalene	µg/L	0.1	29	40	60 - 140	73
		Acenaphthylene	µg/L	0.1	30	40	60 - 140	76
		Acenaphthene	µg/L	0.1	30	40	60 - 140	75
		Phenanthrene	µg/L	0.1	31	40	60 - 140	76
		Anthracene	µg/L	0.1	31	40	60 - 140	77
		Fluoranthene	µg/L	0.1	30	40	60 - 140	76
		Pyrene	µg/L	0.1	31	40	60 - 140	79
		Benzo(a)pyrene	µg/L	0.1	33	40	60 - 140	81
	Surrogates	d5-nitrobenzene (Surrogate)	µg/L	-	0.3	0.5	40 - 130	68
		2-fluorobiphenyl (Surrogate)	µg/L	-	0.3	0.5	40 - 130	68
		d14-p-terphenyl (Surrogate)	µg/L	-	0.4	0.5	40 - 130	76

PCBs in Soil

Method: ME-(AU)-[ENV]AN420

Sample Number	Parameter	Units	LOR	Result	Expected	Criteria %	Recovery %
LB172299.002	Arochlor 1260	mg/kg	0.2	0.3	0.4	60 - 140	79
LB172300.002	Arochlor 1260	mg/kg	0.2	0.4	0.4	60 - 140	104

PCBs in Water

Method: ME-(AU)-[ENV]AN420

Sample Number	Parameter	Units	LOR	Result	Expected	Criteria %	Recovery %
LB172310.002	Arochlor 1260	µg/L	1	<1	0.4	60 - 140	103

Total Recoverable Elements in Soil/Waste Solids/Materials by ICPOES

Method: ME-(AU)-[ENV]AN040/AN320

Sample Number	Parameter	Units	LOR	Result	Expected	Criteria %	Recovery %
LB172303.002	Arsenic, As	mg/kg	1	360	336.32	79 - 120	108
	Cadmium, Cd	mg/kg	0.3	440	416.6	69 - 131	106
	Chromium, Cr	mg/kg	0.3	41	35.2	80 - 120	118
	Copper, Cu	mg/kg	0.5	340	370.46	80 - 120	92
	Nickel, Ni	mg/kg	0.5	200	210.88	79 - 120	96
	Lead, Pb	mg/kg	1	98	107.87	79 - 120	91
	Zinc, Zn	mg/kg	2	300	301.27	80 - 121	100
LB172304.002	Arsenic, As	mg/kg	1	360	336.32	79 - 120	108
	Cadmium, Cd	mg/kg	0.3	440	416.6	69 - 131	106
	Chromium, Cr	mg/kg	0.3	41	35.2	80 - 120	116
	Copper, Cu	mg/kg	0.5	340	370.46	80 - 120	91
	Nickel, Ni	mg/kg	0.5	200	210.88	79 - 120	96
	Lead, Pb	mg/kg	1	98	107.87	79 - 120	91
	Zinc, Zn	mg/kg	2	300	301.27	80 - 121	99

Trace Metals (Dissolved) in Water by ICPMS

Method: ME-(AU)-[ENV]AN318

Sample Number	Parameter	Units	LOR

Laboratory Control Standard (LCS) results are evaluated against an expected result, typically the concentration of analyte spiked into the control during the sample preparation stage, producing a percentage recovery. The criteria applied to the percentage recovery is established in the SGS QA /QC plan (Ref: MP-(AU)-[ENV]QU-022). For more information refer to the footnotes in the concluding page of this report.

Recovery is shown in **Green** when within suggested criteria or **Red** with an appended dagger symbol (†) when outside suggested criteria.

Trace Metals (Dissolved) in Water by ICPMS (continued)

Method: ME-(AU)-[ENV]AN318

Sample Number		Parameter	Units	LOR	Result	Expected	Criteria %	Recovery %
LB172364.002		Arsenic, As	µg/L	1	20	20	80 - 120	98
		Cadmium, Cd	µg/L	0.1	22	20	80 - 120	112
		Chromium, Cr	µg/L	1	24	20	80 - 120	119
		Copper, Cu	µg/L	1	24	20	80 - 120	118
		Lead, Pb	µg/L	1	23	20	80 - 120	113
		Nickel, Ni	µg/L	1	22	20	80 - 120	109
		Zinc, Zn	µg/L	5	22	20	80 - 120	108

TRH (Total Recoverable Hydrocarbons) in Soil

Method: ME-(AU)-[ENV]AN403

Sample Number		Parameter	Units	LOR	Result	Expected	Criteria %	Recovery %
LB172299.002		TRH C10-C14	mg/kg	20	44	40	60 - 140	110
		TRH C15-C28	mg/kg	45	<45	40	60 - 140	103
		TRH C29-C36	mg/kg	45	<45	40	60 - 140	83
	TRH F Bands	TRH >C10-C16	mg/kg	25	43	40	60 - 140	108
		TRH >C16-C34 (F3)	mg/kg	90	<90	40	60 - 140	93
		TRH >C34-C40 (F4)	mg/kg	120	<120	20	60 - 140	85
LB172300.002		TRH C10-C14	mg/kg	20	47	40	60 - 140	118
		TRH C15-C28	mg/kg	45	<45	40	60 - 140	105
		TRH C29-C36	mg/kg	45	<45	40	60 - 140	75
	TRH F Bands	TRH >C10-C16	mg/kg	25	46	40	60 - 140	115
		TRH >C16-C34 (F3)	mg/kg	90	<90	40	60 - 140	90
		TRH >C34-C40 (F4)	mg/kg	120	<120	20	60 - 140	75

TRH (Total Recoverable Hydrocarbons) in Water

Method: ME-(AU)-[ENV]AN403

Sample Number		Parameter	Units	LOR	Result	Expected	Criteria %	Recovery %
LB172310.002		TRH C10-C14	µg/L	50	1400	1200	60 - 140	113
		TRH C15-C28	µg/L	200	1400	1200	60 - 140	119
		TRH C29-C36	µg/L	200	1400	1200	60 - 140	118
	TRH F Bands	TRH >C10-C16	µg/L	60	1400	1200	60 - 140	119
		TRH >C16-C34 (F3)	µg/L	500	1400	1200	60 - 140	116
		TRH >C34-C40 (F4)	µg/L	500	630	600	60 - 140	106

VOC's in Soil

Method: ME-(AU)-[ENV]AN433

Sample Number		Parameter	Units	LOR	Result	Expected	Criteria %	Recovery %
LB172297.002	Monocyclic Aromatic	Benzene	mg/kg	0.1	2.2	2.9	60 - 140	76
		Toluene	mg/kg	0.1	2.1	2.9	60 - 140	72
		Ethylbenzene	mg/kg	0.1	2.3	2.9	60 - 140	79
		m/p-xylene	mg/kg	0.2	4.5	5.8	60 - 140	78
		o-xylene	mg/kg	0.1	2.3	2.9	60 - 140	79
	Surrogates	Dibromofluoromethane (Surrogate)	mg/kg	-	5.4	5	60 - 140	109
		d4-1,2-dichloroethane (Surrogate)	mg/kg	-	5.5	5	60 - 140	111
		d8-toluene (Surrogate)	mg/kg	-	4.0	5	60 - 140	80
		Bromofluorobenzene (Surrogate)	mg/kg	-	4.4	5	60 - 140	87
LB172298.002	Monocyclic Aromatic	Benzene	mg/kg	0.1	2.7	2.9	60 - 140	94
		Toluene	mg/kg	0.1	2.7	2.9	60 - 140	92
		Ethylbenzene	mg/kg	0.1	2.4	2.9	60 - 140	83
		m/p-xylene	mg/kg	0.2	5.0	5.8	60 - 140	86
		o-xylene	mg/kg	0.1	2.2	2.9	60 - 140	75
	Surrogates	Dibromofluoromethane (Surrogate)	mg/kg	-	3.6	5	60 - 140	72
		d4-1,2-dichloroethane (Surrogate)	mg/kg	-	3.8	5	60 - 140	76
		d8-toluene (Surrogate)	mg/kg	-	3.6	5	60 - 140	72
		Bromofluorobenzene (Surrogate)	mg/kg	-	3.7	5	60 - 140	74

VOCs in Water

Method: ME-(AU)-[ENV]AN433

Sample Number		Parameter	Units	LOR	Result	Expected	Criteria %	Recovery %
LB172301.002	Monocyclic Aromatic	Benzene	µg/L	0.5	50	45.45	60 - 140	111
		Toluene	µg/L	0.5	50	45.45	60 - 140	110
		Ethylbenzene	µg/L	0.5	50	45.45	60 - 140	110
		m/p-xylene	µg/L	1	100	90.9	60 - 140	110
		o-xylene	µg/L	0.5	50	45.45	60 - 140	110
	Surrogates	Dibromofluoromethane (Surrogate)	µg/L	-	4.8	5	60 - 140	95
		d4-1,2-dichloroethane (Surrogate)	µg/L	-	4.7	5	60 - 140	94
		d8-toluene (Surrogate)	µg/L	-	5.0	5	60 - 140	100

Laboratory Control Standard (LCS) results are evaluated against an expected result, typically the concentration of analyte spiked into the control during the sample preparation stage, producing a percentage recovery. The criteria applied to the percentage recovery is established in the SGS QA /QC plan (Ref: MP-(AU)-[ENV]QU-022). For more information refer to the footnotes in the concluding page of this report.

Recovery is shown in **Green** when within suggested criteria or **Red** with an appended dagger symbol (†) when outside suggested criteria.

VOCs in Water (continued)

Method: ME-(AU)-[ENV]AN433

Sample Number		Parameter	Units	LOR	Result	Expected	Criteria %	Recovery %
LB172301.002	Surrogates	Bromofluorobenzene (Surrogate)	µg/L	-	3.8	5	60 - 140	77

Volatile Petroleum Hydrocarbons in Soil

Method: ME-(AU)-[ENV]AN433

Sample Number		Parameter	Units	LOR	Result	Expected	Criteria %	Recovery %
LB172297.002		TRH C6-C10	mg/kg	25	<25	24.65	60 - 140	90
		TRH C6-C9	mg/kg	20	23	23.2	60 - 140	99
	Surrogates	Dibromofluoromethane (Surrogate)	mg/kg	-	5.4	5	60 - 140	109
		d4-1,2-dichloroethane (Surrogate)	mg/kg	-	5.5	5	60 - 140	111
		d8-toluene (Surrogate)	mg/kg	-	4.0	5	60 - 140	80
		Bromofluorobenzene (Surrogate)	mg/kg	-	4.4	5	60 - 140	87
	VPH F Bands	TRH C6-C10 minus BTEX (F1)	mg/kg	25	<25	7.25	60 - 140	123
LB172298.002		TRH C6-C10	mg/kg	25	<25	24.65	60 - 140	93
		TRH C6-C9	mg/kg	20	23	23.2	60 - 140	101
	Surrogates	Dibromofluoromethane (Surrogate)	mg/kg	-	3.6	5	60 - 140	72
		d4-1,2-dichloroethane (Surrogate)	mg/kg	-	3.8	5	60 - 140	76
		d8-toluene (Surrogate)	mg/kg	-	3.6	5	60 - 140	72
		Bromofluorobenzene (Surrogate)	mg/kg	-	3.7	5	60 - 140	74
	VPH F Bands	TRH C6-C10 minus BTEX (F1)	mg/kg	25	<25	7.25	60 - 140	109

Volatile Petroleum Hydrocarbons in Water

Method: ME-(AU)-[ENV]AN433

Sample Number		Parameter	Units	LOR	Result	Expected	Criteria %	Recovery %
LB172301.002		TRH C6-C10	µg/L	50	960	946.63	60 - 140	102
		TRH C6-C9	µg/L	40	780	818.71	60 - 140	96
	Surrogates	Dibromofluoromethane (Surrogate)	µg/L	-	4.0	5	60 - 140	79
		d4-1,2-dichloroethane (Surrogate)	µg/L	-	4.0	5	60 - 140	79
		d8-toluene (Surrogate)	µg/L	-	4.1	5	60 - 140	82
		Bromofluorobenzene (Surrogate)	µg/L	-	5.7	5	60 - 140	114
	VPH F Bands	TRH C6-C10 minus BTEX (F1)	µg/L	50	660	639.67	60 - 140	103

Matrix Spike (MS) results are evaluated as the percentage recovery of an expected result, typically the concentration of analyte spiked into a field sub -sample during the sample preparation stage. The original sample's result is subtracted from the sub-sample result before determining the percentage recovery. The criteria applied to the percentage recovery is established in the SGS QA/QC plan (ref: MP-(AU)-[ENV]QU-022). For more information refer to the footnotes in the concluding page of this report.

Recovery is shown in **Green** when within suggested criteria or **Red** with an appended reason identifer when outside suggested criteria. Refer to the footnotes section at the end of this report for failure reasons.

Mercury (dissolved) in Water

Method: ME-(AU)-[ENV]AN311(Perth)/AN312

QC Sample	Sample Number	Parameter	Units	LOR	Result	Original	Spike	Recovery%
SE191719.001	LB172370.004	Mercury	mg/L	0.0001	0.0088	<0.0001	0.008	110

Mercury in Soil

Method: ME-(AU)-[ENV]AN312

QC Sample	Sample Number	Parameter	Units	LOR	Result	Original	Spike	Recovery%
SE192028.001	LB172303.004	Mercury	mg/kg	0.05	0.23	<0.05	0.2	107
SE192028.020	LB172305.004	Mercury	mg/kg	0.05	0.22	<0.05	0.2	91

OC Pesticides in Soil

Method: ME-(AU)-[ENV]AN420

QC Sample	Sample Number		Parameter	Units	LOR	Original	Spike	Recovery%
SE192028.002	LB172299.026		Hexachlorobenzene (HCB)	mg/kg	0.1	<0.1	-	-
			Alpha BHC	mg/kg	0.1	<0.1	-	-
			Lindane	mg/kg	0.1	<0.1	-	-
			Heptachlor	mg/kg	0.1	<0.1	0.2	97
			Aldrin	mg/kg	0.1	<0.1	0.2	101
			Beta BHC	mg/kg	0.1	<0.1	-	-
			Delta BHC	mg/kg	0.1	<0.1	0.2	94
			Heptachlor epoxide	mg/kg	0.1	<0.1	-	-
			o,p'-DDE	mg/kg	0.1	<0.1	-	-
			Alpha Endosulfan	mg/kg	0.2	<0.2	-	-
			Gamma Chlordane	mg/kg	0.1	<0.1	-	-
			Alpha Chlordane	mg/kg	0.1	<0.1	-	-
			trans-Nonachlor	mg/kg	0.1	<0.1	-	-
			p,p'-DDE	mg/kg	0.1	<0.1	-	-
			Dieldrin	mg/kg	0.2	<0.2	0.2	92
			Endrin	mg/kg	0.2	<0.2	0.2	92
			o,p'-DDD	mg/kg	0.1	<0.1	-	-
			o,p'-DDT	mg/kg	0.1	<0.1	-	-
			Beta Endosulfan	mg/kg	0.2	<0.2	-	-
			p,p'-DDD	mg/kg	0.1	<0.1	-	-
			p,p'-DDT	mg/kg	0.1	<0.1	0.2	80
			Endosulfan sulphate	mg/kg	0.1	<0.1	-	-
			Endrin Aldehyde	mg/kg	0.1	<0.1	-	-
			Methoxychlor	mg/kg	0.1	<0.1	-	-
			Endrin Ketone	mg/kg	0.1	<0.1	-	-
			Isodrin	mg/kg	0.1	<0.1	-	-
			Mirex	mg/kg	0.1	<0.1	-	-
			Total CLP OC Pesticides	mg/kg	1	<1	-	-
		Surrogates	Tetrachloro-m-xylene (TCMX) (Surrogate)	mg/kg	-	0.15	-	106
SE192028.022	LB172300.024		Hexachlorobenzene (HCB)	mg/kg	0.1	<0.1	-	-
			Alpha BHC	mg/kg	0.1	<0.1	-	-
			Lindane	mg/kg	0.1	<0.1	-	-
			Heptachlor	mg/kg	0.1	<0.1	0.2	75
			Aldrin	mg/kg	0.1	<0.1	0.2	90
			Beta BHC	mg/kg	0.1	<0.1	-	-
			Delta BHC	mg/kg	0.1	<0.1	0.2	86
			Heptachlor epoxide	mg/kg	0.1	<0.1	-	-
			o,p'-DDE	mg/kg	0.1	<0.1	-	-
			Alpha Endosulfan	mg/kg	0.2	<0.2	-	-
			Gamma Chlordane	mg/kg	0.1	<0.1	-	-
			Alpha Chlordane	mg/kg	0.1	<0.1	-	-
			trans-Nonachlor	mg/kg	0.1	<0.1	-	-
			p,p'-DDE	mg/kg	0.1	<0.1	-	-
			Dieldrin	mg/kg	0.2	<0.2	0.2	91
			Endrin	mg/kg	0.2	<0.2	0.2	82
			o,p'-DDD	mg/kg	0.1	<0.1	-	-
			o,p'-DDT	mg/kg	0.1	<0.1	-	-
			Beta Endosulfan	mg/kg	0.2	<0.2	-	-
			p,p'-DDD	mg/kg	0.1	<0.1	-	-

Matrix Spike (MS) results are evaluated as the percentage recovery of an expected result, typically the concentration of analyte spiked into a field sub -sample during the sample preparation stage. The original sample's result is subtracted from the sub-sample result before determining the percentage recovery. The criteria applied to the percentage recovery is established in the SGS QA/QC plan (ref: MP-(AU)-[ENV]QU-022). For more information refer to the footnotes in the concluding page of this report.

Recovery is shown in **Green** when within suggested criteria or **Red** with an appended reason identifer when outside suggested criteria. Refer to the footnotes section at the end of this report for failure reasons.

OC Pesticides in Soil (continued)

Method: ME-(AU)-[ENV]AN420

QC Sample	Sample Number		Parameter	Units	LOR	Original	Spike	Recovery%
SE192028.022	LB172300.024		p,p'-DDT	mg/kg	0.1	<0.1	0.2	79
			Endosulfan sulphate	mg/kg	0.1	<0.1	-	-
			Endrin Aldehyde	mg/kg	0.1	<0.1	-	-
			Methoxychlor	mg/kg	0.1	<0.1	-	-
			Endrin Ketone	mg/kg	0.1	<0.1	-	-
			Isodrin	mg/kg	0.1	<0.1	-	-
			Mirex	mg/kg	0.1	<0.1	-	-
			Total CLP OC Pesticides	mg/kg	1	<1	-	-
		Surrogates	Tetrachloro-m-xylene (TCMX) (Surrogate)	mg/kg	-	0.15	-	98

OP Pesticides in Soil

Method: ME-(AU)-[ENV]AN420

QC Sample	Sample Number		Parameter	Units	LOR	Original	Spike	Recovery%
SE192028.002	LB172299.026		Dichlorvos	mg/kg	0.5	<0.5	2	103
			Dimethoate	mg/kg	0.5	<0.5	-	-
			Diazinon (Dimpylate)	mg/kg	0.5	<0.5	2	112
			Fenitrothion	mg/kg	0.2	<0.2	-	-
			Malathion	mg/kg	0.2	<0.2	-	-
			Chlorpyrifos (Chlorpyrifos Ethyl)	mg/kg	0.2	<0.2	2	127
			Parathion-ethyl (Parathion)	mg/kg	0.2	<0.2	-	-
			Bromophos Ethyl	mg/kg	0.2	<0.2	-	-
			Methidathion	mg/kg	0.5	<0.5	-	-
			Ethion	mg/kg	0.2	<0.2	2	105
			Azinphos-methyl (Guthion)	mg/kg	0.2	<0.2	-	-
			Total OP Pesticides*	mg/kg	1.7	<1.7	-	-
		Surrogates	2-fluorobiphenyl (Surrogate)	mg/kg	-	0.5	-	92
			d14-p-terphenyl (Surrogate)	mg/kg	-	0.5	-	92
SE192028.022	LB172300.023		Dichlorvos	mg/kg	0.5	<0.5	2	96
			Dimethoate	mg/kg	0.5	<0.5	-	-
			Diazinon (Dimpylate)	mg/kg	0.5	<0.5	2	113
			Fenitrothion	mg/kg	0.2	<0.2	-	-
			Malathion	mg/kg	0.2	<0.2	-	-
			Chlorpyrifos (Chlorpyrifos Ethyl)	mg/kg	0.2	<0.2	2	94
			Parathion-ethyl (Parathion)	mg/kg	0.2	<0.2	-	-
			Bromophos Ethyl	mg/kg	0.2	<0.2	-	-
			Methidathion	mg/kg	0.5	<0.5	-	-
			Ethion	mg/kg	0.2	<0.2	2	110
			Azinphos-methyl (Guthion)	mg/kg	0.2	<0.2	-	-
			Total OP Pesticides*	mg/kg	1.7	<1.7	-	-
		Surrogates	2-fluorobiphenyl (Surrogate)	mg/kg	-	0.5	-	98
			d14-p-terphenyl (Surrogate)	mg/kg	-	0.5	-	102

PAH (Polynuclear Aromatic Hydrocarbons) in Soil

Method: ME-(AU)-[ENV]AN420

QC Sample	Sample Number		Parameter	Units	LOR	Original	Spike	Recovery%
SE192028.002	LB172299.026		Naphthalene	mg/kg	0.1	<0.1	4	103
			2-methylnaphthalene	mg/kg	0.1	<0.1	-	-
			1-methylnaphthalene	mg/kg	0.1	<0.1	-	-
			Acenaphthylene	mg/kg	0.1	<0.1	4	110
			Acenaphthene	mg/kg	0.1	<0.1	4	107
			Fluorene	mg/kg	0.1	<0.1	-	-
			Phenanthrene	mg/kg	0.1	<0.1	4	111
			Anthracene	mg/kg	0.1	<0.1	4	102
			Fluoranthene	mg/kg	0.1	<0.1	4	101
			Pyrene	mg/kg	0.1	<0.1	4	107
			Benzo(a)anthracene	mg/kg	0.1	<0.1	-	-
			Chrysene	mg/kg	0.1	<0.1	-	-
			Benzo(b&j)fluoranthene	mg/kg	0.1	<0.1	-	-
			Benzo(k)fluoranthene	mg/kg	0.1	<0.1	-	-
			Benzo(a)pyrene	mg/kg	0.1	<0.1	4	103
			Indeno(1,2,3-cd)pyrene	mg/kg	0.1	<0.1	-	-
			Dibenzo(ah)anthracene	mg/kg	0.1	<0.1	-	-
			Benzo(ghi)perylene	mg/kg	0.1	<0.1	-	-
			Carcinogenic PAHs, BaP TEQ <LOR=0	TEQ (mg/kg)	0.2	<0.2	-	-

Matrix Spike (MS) results are evaluated as the percentage recovery of an expected result, typically the concentration of analyte spiked into a field sub-sample during the sample preparation stage. The original sample's result is subtracted from the sub-sample result before determining the percentage recovery. The criteria applied to the percentage recovery is established in the SGS QA/QC plan (ref: MP-(AU)-[ENV]QU-022). For more information refer to the footnotes in the concluding page of this report.

Recovery is shown in **Green** when within suggested criteria or **Red** with an appended reason identifer when outside suggested criteria. Refer to the footnotes section at the end of this report for failure reasons.

PAH (Polynuclear Aromatic Hydrocarbons) in Soil (continued)

Method: ME-(AU)-[ENV]AN420

QC Sample	Sample Number		Parameter	Units	LOR	Original	Spike	Recovery%
SE192028.002	LB172299.026		Carcinogenic PAHs, BaP TEQ <LOR=LOR	TEQ (mg/kg)	0.3	<0.3	-	-
			Carcinogenic PAHs, BaP TEQ <LOR=LOR/2	TEQ (mg/kg)	0.2	<0.2	-	-
			Total PAH (18)	mg/kg	0.8	<0.8	-	-
		Surrogates	d5-nitrobenzene (Surrogate)	mg/kg	-	0.5	-	98
			2-fluorobiphenyl (Surrogate)	mg/kg	-	0.5	-	92
			d14-p-terphenyl (Surrogate)	mg/kg	-	0.5	-	92
SE192028.022	LB172300.023		Naphthalene	mg/kg	0.1	<0.1	4	106
			2-methylnaphthalene	mg/kg	0.1	<0.1	-	-
			1-methylnaphthalene	mg/kg	0.1	<0.1	-	-
			Acenaphthylene	mg/kg	0.1	<0.1	4	113
			Acenaphthene	mg/kg	0.1	<0.1	4	108
			Fluorene	mg/kg	0.1	<0.1	-	-
			Phenanthrene	mg/kg	0.1	<0.1	4	110
			Anthracene	mg/kg	0.1	<0.1	4	107
			Fluoranthene	mg/kg	0.1	0.2	4	119
			Pyrene	mg/kg	0.1	0.2	4	110
			Benzo(a)anthracene	mg/kg	0.1	<0.1	-	-
			Chrysene	mg/kg	0.1	<0.1	-	-
			Benzo(b&j)fluoranthene	mg/kg	0.1	<0.1	-	-
			Benzo(k)fluoranthene	mg/kg	0.1	<0.1	-	-
			Benzo(a)pyrene	mg/kg	0.1	<0.1	4	112
			Indeno(1,2,3-cd)pyrene	mg/kg	0.1	<0.1	-	-
			Dibenzo(ah)anthracene	mg/kg	0.1	<0.1	-	-
			Benzo(ghi)perylene	mg/kg	0.1	<0.1	-	-
			Carcinogenic PAHs, BaP TEQ <LOR=0	TEQ (mg/kg)	0.2	<0.2	-	-
			Carcinogenic PAHs, BaP TEQ <LOR=LOR	TEQ (mg/kg)	0.3	<0.3	-	-
			Carcinogenic PAHs, BaP TEQ <LOR=LOR/2	TEQ (mg/kg)	0.2	<0.2	-	-
			Total PAH (18)	mg/kg	0.8	<0.8	-	-
		Surrogates	d5-nitrobenzene (Surrogate)	mg/kg	-	0.5	-	100
			2-fluorobiphenyl (Surrogate)	mg/kg	-	0.5	-	98
			d14-p-terphenyl (Surrogate)	mg/kg	-	0.5	-	102

PCBs in Soil

Method: ME-(AU)-[ENV]AN420

QC Sample	Sample Number		Parameter	Units	LOR	Original	Spike	Recovery%
SE192028.002	LB172299.026		Arochlor 1016	mg/kg	0.2	<0.2	-	-
			Arochlor 1221	mg/kg	0.2	<0.2	-	-
			Arochlor 1232	mg/kg	0.2	<0.2	-	-
			Arochlor 1242	mg/kg	0.2	<0.2	-	-
			Arochlor 1248	mg/kg	0.2	<0.2	-	-
			Arochlor 1254	mg/kg	0.2	<0.2	-	-
			Arochlor 1260	mg/kg	0.2	<0.2	0.4	81
			Arochlor 1262	mg/kg	0.2	<0.2	-	-
			Arochlor 1268	mg/kg	0.2	<0.2	-	-
			Total PCBs (Arochlors)	mg/kg	1	<1	-	-
		Surrogates	Tetrachloro-m-xylene (TCMX) (Surrogate)	mg/kg	-	0	-	111
SE192028.022	LB172300.024		Arochlor 1016	mg/kg	0.2	<0.2	-	-
			Arochlor 1221	mg/kg	0.2	<0.2	-	-
			Arochlor 1232	mg/kg	0.2	<0.2	-	-
			Arochlor 1242	mg/kg	0.2	<0.2	-	-
			Arochlor 1248	mg/kg	0.2	<0.2	-	-
			Arochlor 1254	mg/kg	0.2	<0.2	-	-
			Arochlor 1260	mg/kg	0.2	<0.2	0.4	111
			Arochlor 1262	mg/kg	0.2	<0.2	-	-
			Arochlor 1268	mg/kg	0.2	<0.2	-	-
			Total PCBs (Arochlors)	mg/kg	1	<1	-	-
		Surrogates	Tetrachloro-m-xylene (TCMX) (Surrogate)	mg/kg	-	0	-	99

Total Recoverable Elements in Soil/Waste Solids/Materials by ICPOES

Method: ME-(AU)-[ENV]AN040/AN320

QC Sample	Sample Number	Parameter	Units	LOR

Matrix Spike (MS) results are evaluated as the percentage recovery of an expected result, typically the concentration of analyte spiked into a field sub -sample during the sample preparation stage. The original sample's result is subtracted from the sub-sample result before determining the percentage recovery. The criteria applied to the percentage recovery is established in the SGS QA/QC plan (ref: MP-(AU)-[ENV]QU-022). For more information refer to the footnotes in the concluding page of this report.

Recovery is shown in **Green** when within suggested criteria or **Red** with an appended reason identifer when outside suggested criteria. Refer to the footnotes section at the end of this report for failure reasons.

Total Recoverable Elements in Soil/Waste Solids/Materials by ICPOES (continued)

Method: ME-(AU)-[ENV]AN040/AN320

QC Sample	Sample Number		Parameter	Units	LOR	Result	Original	Spike	Recovery%
SE192028.001	LB172303.004		Arsenic, As	mg/kg	1	50	<1	50	98
			Cadmium, Cd	mg/kg	0.3	49	<0.3	50	98
			Chromium, Cr	mg/kg	0.3	66	19	50	94
			Copper, Cu	mg/kg	0.5	58	8.6	50	98
			Nickel, Ni	mg/kg	0.5	57	9.2	50	95
			Lead, Pb	mg/kg	1	60	12	50	95
			Zinc, Zn	mg/kg	2	88	40	50	94
SE192028.020	LB172304.004		Arsenic, As	mg/kg	1	48	4	50	88
			Cadmium, Cd	mg/kg	0.3	49	<0.3	50	98
			Chromium, Cr	mg/kg	0.3	110	75	50	80
			Copper, Cu	mg/kg	0.5	89	45	50	87
			Nickel, Ni	mg/kg	0.5	120	72	50	90
			Lead, Pb	mg/kg	1	77	32	50	91
			Zinc, Zn	mg/kg	2	130	95	50	75

TRH (Total Recoverable Hydrocarbons) in Soil

Method: ME-(AU)-[ENV]AN403

QC Sample	Sample Number		Parameter	Units	LOR	Original	Spike	Recovery%
SE192028.002	LB172299.026		TRH C10-C14	mg/kg	20	<20	40	98
			TRH C15-C28	mg/kg	45	<45	40	100
			TRH C29-C36	mg/kg	45	<45	40	120
			TRH C37-C40	mg/kg	100	<100	-	-
			TRH C10-C36 Total	mg/kg	110	<110	-	-
			TRH C10-C40 Total (F bands)	mg/kg	210	<210	-	-
		TRH F Bands	TRH >C10-C16	mg/kg	25	<25	40	95
			TRH >C10-C16 - Naphthalene (F2)	mg/kg	25	<25	-	-
			TRH >C16-C34 (F3)	mg/kg	90	<90	40	118
			TRH >C34-C40 (F4)	mg/kg	120	<120	-	-
SE192028.022	LB172300.023		TRH C10-C14	mg/kg	20	<20	40	110
			TRH C15-C28	mg/kg	45	<45	40	135
			TRH C29-C36	mg/kg	45	79	40	140
			TRH C37-C40	mg/kg	100	<100	-	-
			TRH C10-C36 Total	mg/kg	110	<110	-	-
			TRH C10-C40 Total (F bands)	mg/kg	210	<210	-	-
		TRH F Bands	TRH >C10-C16	mg/kg	25	<25	40	108
			TRH >C10-C16 - Naphthalene (F2)	mg/kg	25	<25	-	-
			TRH >C16-C34 (F3)	mg/kg	90	<90	40	140
			TRH >C34-C40 (F4)	mg/kg	120	<120	-	-

VOC's in Soil

Method: ME-(AU)-[ENV]AN433

QC Sample	Sample Number		Parameter	Units	LOR	Result	Original	Spike	Recovery%
SE192028.001	LB172297.004	Monocyclic Aromatic	Benzene	mg/kg	0.1	1.9	<0.1	2.9	67
			Toluene	mg/kg	0.1	2.0	<0.1	2.9	68
			Ethylbenzene	mg/kg	0.1	2.1	<0.1	2.9	73
			m/p-xylene	mg/kg	0.2	4.2	<0.2	5.8	72
			o-xylene	mg/kg	0.1	2.2	<0.1	2.9	74
		Polycyclic	Naphthalene	mg/kg	0.1	<0.1	<0.1	-	-
		Surrogates	Dibromofluoromethane (Surrogate)	mg/kg	-	4.6	5.2	-	93
			d4-1,2-dichloroethane (Surrogate)	mg/kg	-	4.8	5.3	-	97
			d8-toluene (Surrogate)	mg/kg	-	3.6	3.9	-	72
			Bromofluorobenzene (Surrogate)	mg/kg	-	3.9	4.0	-	78
		Totals	Total Xylenes	mg/kg	0.3	6.4	<0.3	-	-
			Total BTEX	mg/kg	0.6	12	<0.6	-	-
SE192028.021	LB172298.004	Monocyclic Aromatic	Benzene	mg/kg	0.1	2.2	<0.1	2.9	75
			Toluene	mg/kg	0.1	2.3	<0.1	2.9	78
			Ethylbenzene	mg/kg	0.1	2.0	<0.1	2.9	66
			m/p-xylene	mg/kg	0.2	3.9	<0.2	5.8	66
			o-xylene	mg/kg	0.1	1.9	<0.1	2.9	67
		Polycyclic	Naphthalene	mg/kg	0.1	<0.1	<0.1	-	-
		Surrogates	Dibromofluoromethane (Surrogate)	mg/kg	-	3.6	3.7	-	73
			d4-1,2-dichloroethane (Surrogate)	mg/kg	-	3.7	3.8	-	74
			d8-toluene (Surrogate)	mg/kg	-	4.1	3.9	-	82
			Bromofluorobenzene (Surrogate)	mg/kg	-	3.6	3.9	-	72

Matrix Spike (MS) results are evaluated as the percentage recovery of an expected result, typically the concentration of analyte spiked into a field sub-sample during the sample preparation stage. The original sample's result is subtracted from the sub-sample result before determining the percentage recovery. The criteria applied to the percentage recovery is established in the SGS QA/QC plan (ref: MP-(AU)-[ENV]QU-022). For more information refer to the footnotes in the concluding page of this report.

Recovery is shown in **Green** when within suggested criteria or **Red** with an appended reason identifer when outside suggested criteria. Refer to the footnotes section at the end of this report for failure reasons.

VOC's in Soil (continued) Method: ME-(AU)-[ENV]AN433

QC Sample	Sample Number		Parameter	Units	LOR	Result	Original	Spike	Recovery%
SE192028.021	LB172298.004	Totals	Total Xylenes	mg/kg	0.3	5.8	<0.3	-	-
			Total BTEX	mg/kg	0.6	12	<0.6	-	-

Volatile Petroleum Hydrocarbons in Soil Method: ME-(AU)-[ENV]AN433

QC Sample	Sample Number		Parameter	Units	LOR	Result	Original	Spike	Recovery%
SE192028.001	LB172297.004		TRH C6-C10	mg/kg	25	<25	<25	24.65	64
			TRH C6-C9	mg/kg	20	21	<20	23.2	92
		Surrogates	Dibromofluoromethane (Surrogate)	mg/kg	-	4.6	5.2	-	93
			d4-1,2-dichloroethane (Surrogate)	mg/kg	-	4.8	5.3	-	97
			d8-toluene (Surrogate)	mg/kg	-	3.6	3.9	-	72
			Bromofluorobenzene (Surrogate)	mg/kg	-	3.9	4.0	-	78
		VPH F Bands	Benzene (F0)	mg/kg	0.1	1.9	<0.1	-	-
			TRH C6-C10 minus BTEX (F1)	mg/kg	25	<25	<25	7.25	118
SE192028.021	LB172298.004		TRH C6-C10	mg/kg	25	<25	<25	24.65	74
			TRH C6-C9	mg/kg	20	<20	<20	23.2	80
		Surrogates	Dibromofluoromethane (Surrogate)	mg/kg	-	3.6	3.7	-	73
			d4-1,2-dichloroethane (Surrogate)	mg/kg	-	3.7	3.8	-	74
			d8-toluene (Surrogate)	mg/kg	-	4.1	3.9	-	82
			Bromofluorobenzene (Surrogate)	mg/kg	-	3.6	3.9	-	72
		VPH F Bands	Benzene (F0)	mg/kg	0.1	2.2	<0.1	-	-
			TRH C6-C10 minus BTEX (F1)	mg/kg	25	<25	<25	7.25	85

MATRIX SPIKE DUPLICATES

Matrix spike duplicates are calculated as Relative Percent Difference (RPD) using the formula: RPD = | OriginalResult - ReplicateResult | x 100 / Mean

The original result is the analyte concentration of the matrix spike. The Duplicate result is the analyte concentration of the matrix spike duplicate.

The RPD is evaluated against the Maximum Allowable Difference (MAD) criteria and can be graphically represented by a curve calculated from the Statistical Detection Limit (SDL) and Limiting Repeatability (LR) using the formula: MAD = 100 x SDL / Mean + LR

Where the Maximum Allowable Difference evaluates to a number larger than 200 it is displayed as 200.

RPD is shown in **Green** when within suggested criteria or **Red** with an appended reason identifer when outside suggested criteria. Refer to the footnotes section at the end of this report for failure reasons.

No matrix spike duplicates were required for this job.

Samples analysed as received.

Solid samples expressed on a dry weight basis.

QC criteria are subject to internal review according to the SGS QA/QC plan and may be provided on request or alternatively can be found here: https://www.sgs.com.au/~/media/Local/Australia/Documents/Technical Documents/MP-AU-ENV-QU-022 QA QC Plan.pdf

*	NATA accreditation does not cover the performance of this service.
**	Indicative data, theoretical holding time exceeded.
-	Sample not analysed for this analyte.
IS	Insufficient sample for analysis.
LNR	Sample listed, but not received.
LOR	Limit of reporting.
QFH	QC result is above the upper tolerance.
QFL	QC result is below the lower tolerance.

①	At least 2 of 3 surrogates are within acceptance criteria.
②	RPD failed acceptance criteria due to sample heterogeneity.
③	Results less than 5 times LOR preclude acceptance criteria for RPD.
④	Recovery failed acceptance criteria due to matrix interference.
⑤	Recovery failed acceptance criteria due to the presence of significant concentration of analyte (i.e. the concentration of analyte exceeds the spike level).
⑥	LOR was raised due to sample matrix interference.
⑦	LOR was raised due to dilution of significantly high concentration of analyte in sample.
⑧	Reanalysis of sample in duplicate confirmed sample heterogeneity and inconsistency of results.
⑨	Recovery failed acceptance criteria due to sample heterogeneity.
⑩	LOR was raised due to high conductivity of the sample (required dilution).
†	Refer to Analytical Report comments for further information.

SGS

ANALYTICAL REPORT

NATA

Accreditation No. 2562

CLIENT DETAILS

Contact	Alex Hannan-Joyner
Client	Robson Environmental Pty Ltd
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Email	alex@robsonenviro.com.au
Project	**J17188**
Order Number	(Not specified)
Samples	17

LABORATORY DETAILS

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SGS Reference	**SE192028 R1**
Date Received	24 Apr 2019
Date Reported	09 May 2019

COMMENTS

Accredited for compliance with ISO/IEC 17025 - Testing. NATA accredited laboratory 2562(4354).

This report cancels and supersedes the report No. SE192028 R0 dated 30.04.19 issued by SGS Environment, Health and Safety due to modifying the project number.

No respirable fibres detected in all soil samples using trace analysis technique.

Asbestos analysed by approved identifiers Ravee Sivasubramaniam and Yusuf Kuthpudin .

SIGNATORIES

Akheeqar Beniameen
Chemist

Huong Crawford
Production Manager

Kamrul Ahsan
Senior Chemist

Ly Kim Ha
Organic Section Head

Ravee Sivasubramaniam
Hygiene Team Leader

RESULTS

Fibre Identification in soil

Method AN602

Laboratory Reference	Client Reference	Matrix	Sample Description	Date Sampled	Fibre Identification	Est.%w/w*
SE192028.001	S01_0-0.1	Soil	587g Sand,Soil,Rocks ,Plant Matter	17 Apr 2019	No Asbestos Found Organic Fibres Detected	<0.01
SE192028.002	S02_0-0.1	Soil	697g Sand,Soil,Rocks ,Plant Matter	17 Apr 2019	No Asbestos Found Organic Fibres Detected	<0.01
SE192028.007	S05_0-0.1	Soil	437g Clay,Sand,Soil, Rocks,Plant Matter	17 Apr 2019	No Asbestos Found Organic Fibres Detected	<0.01
SE192028.011	S07_0-0.1	Soil	845g Clay,Sand,Soil, Rocks,Plant Matter	17 Apr 2019	No Asbestos Found Organic Fibres Detected	<0.01
SE192028.012	S08_0-0.1	Soil	740g Clay,Sand,Soil, Rocks,Plant Matter	17 Apr 2019	No Asbestos Found Organic Fibres Detected	<0.01
SE192028.015	S10_0-0.1	Soil	389g Clay,Sand,Soil, Rocks,Plant Matter	17 Apr 2019	No Asbestos Found Organic Fibres Detected	<0.01
SE192028.016	S11_0-0.1	Soil	477g Sand,Soil,Rocks ,Plant Matter	17 Apr 2019	No Asbestos Found Organic Fibres Detected	<0.01
SE192028.018	S12_0-0.1	Soil	676g Sand,Soil,Rocks ,Plant Matter	17 Apr 2019	No Asbestos Found Organic Fibres Detected	<0.01
SE192028.020	S14_0-0.1	Soil	577g Clay,Sand,Soil, Rocks	17 Apr 2019	No Asbestos Found Organic Fibres Detected	<0.01
SE192028.023	S16_0-0.1	Soil	967g Sand,Soil,Rocks	17 Apr 2019	No Asbestos Found Organic Fibres Detected	<0.01
SE192028.025	S18_0-0.1	Soil	528g Clay,Sand,Soil, Rocks	17 Apr 2019	No Asbestos Found Organic Fibres Detected	<0.01
SE192028.026	S19_0-0.1	Soil	637g Clay,Sand,Soil, Rocks	17 Apr 2019	No Asbestos Found Organic Fibres Detected	<0.01
SE192028.028	S20_0-0.1	Soil	634g Clay,Sand,Soil, Rocks	17 Apr 2019	No Asbestos Found Organic Fibres Detected	<0.01
SE192028.032	S23_0-0.1	Soil	967g Sand,Soil,Rocks	17 Apr 2019	No Asbestos Found	<0.01
SE192028.033	S24_0-0.1	Soil	1032g Sand,Soil,Rocks	17 Apr 2019	No Asbestos Found	<0.01
SE192028.034	S25_0-0.2	Soil	777g Sand,Soil,Rocks ,Bitumen	17 Apr 2019	No Asbestos Found	<0.01
SE192028.035	S26_0-0.2	Soil	1000g Sand,Soil,Rocks	17 Apr 2019	No Asbestos Found	.<0.01

Gravimetric Determination of Asbestos in Soil [AN605] Tested: 26/4/2019

PARAMETER	UOM	LOR	S01_0-0.1 SOIL - 17/4/2019 SE192028.001	S02_0-0.1 SOIL - 17/4/2019 SE192028.002	S05_0-0.1 SOIL - 17/4/2019 SE192028.007	S07_0-0.1 SOIL - 17/4/2019 SE192028.011	S08_0-0.1 SOIL - 17/4/2019 SE192028.012
Total Sample Weight*	g	1	587	697	437	845	740
ACM in >7mm Sample*	g	0.01	<0.01	<0.01	<0.01	<0.01	<0.01
AF/FA in >2mm to <7mm Sample*	g	0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001
AF/FA in <2mm Sample*	g	0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001
Asbestos in soil (>7mm ACM)*	%w/w	0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Asbestos in soil (>2mm to <7mm AF/FA)*	%w/w	0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Asbestos in soil (<2mm AF/FA)*	%w/w	0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Asbestos in soil (<7mm AF/FA)*	%w/w	0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Fibre Type*	No unit	-	-	-	-	-	-

PARAMETER	UOM	LOR	S10_0-0.1 SOIL - 17/4/2019 SE192028.015	S11_0-0.1 SOIL - 17/4/2019 SE192028.016	S12_0-0.1 SOIL - 17/4/2019 SE192028.018	S14_0-0.1 SOIL - 17/4/2019 SE192028.020	S16_0-0.1 SOIL - 17/4/2019 SE192028.023
Total Sample Weight*	g	1	389	477	676	577	967
ACM in >7mm Sample*	g	0.01	<0.01	<0.01	<0.01	<0.01	<0.01
AF/FA in >2mm to <7mm Sample*	g	0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001
AF/FA in <2mm Sample*	g	0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001
Asbestos in soil (>7mm ACM)*	%w/w	0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Asbestos in soil (>2mm to <7mm AF/FA)*	%w/w	0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Asbestos in soil (<2mm AF/FA)*	%w/w	0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Asbestos in soil (<7mm AF/FA)*	%w/w	0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Fibre Type*	No unit	-	-	-	-	-	-

PARAMETER	UOM	LOR	S18_0-0.1 SOIL - 17/4/2019 SE192028.025	S19_0-0.1 SOIL - 17/4/2019 SE192028.026	S20_0-0.1 SOIL - 17/4/2019 SE192028.028	S23_0-0.1 SOIL - 17/4/2019 SE192028.032	S24_0-0.1 SOIL - 17/4/2019 SE192028.033
Total Sample Weight*	g	1	528	637	634	967	1032
ACM in >7mm Sample*	g	0.01	<0.01	<0.01	<0.01	<0.01	<0.01
AF/FA in >2mm to <7mm Sample*	g	0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001
AF/FA in <2mm Sample*	g	0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001
Asbestos in soil (>7mm ACM)*	%w/w	0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Asbestos in soil (>2mm to <7mm AF/FA)*	%w/w	0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Asbestos in soil (<2mm AF/FA)*	%w/w	0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Asbestos in soil (<7mm AF/FA)*	%w/w	0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Fibre Type*	No unit	-	-	-	-	-	-

PARAMETER	UOM	LOR	S25_0-0.2 SOIL - 17/4/2019 SE192028.034	S26_0-0.2 SOIL - 17/4/2019 SE192028.035
Total Sample Weight*	g	1	777	1000
ACM in >7mm Sample*	g	0.01	<0.01	<0.01
AF/FA in >2mm to <7mm Sample*	g	0.0001	<0.0001	<0.0001
AF/FA in <2mm Sample*	g	0.0001	<0.0001	<0.0001
Asbestos in soil (>7mm ACM)*	%w/w	0.01	<0.01	<0.01
Asbestos in soil (>2mm to <7mm AF/FA)*	%w/w	0.001	<0.001	<0.001
Asbestos in soil (<2mm AF/FA)*	%w/w	0.001	<0.001	<0.001
Asbestos in soil (<7mm AF/FA)*	%w/w	0.001	<0.001	<0.001
Fibre Type*	No unit	-	-	-

METHOD SUMMARY

METHOD	METHODOLOGY SUMMARY
AN602	Qualitative identification of chrysotile, amosite and crocidolite in bulk samples by polarised light microscopy (PLM) in conjunction with dispersion staining (DS). AS4964 provides the basis for this document. Unequivocal identification of the asbestos minerals present is made by obtaining sufficient diagnostic `clues`, which provide a reasonable degree of certainty, dispersion staining is a mandatory `clue` for positive identification. If sufficient `clues` are absent, then positive identification of asbestos is not possible. This procedure requires removal of suspect fibres/bundles from the sample which cannot be returned.
AN602	Fibres/material that cannot be unequivocably identified as one of the three asbestos forms, will be reported as unknown mineral fibres (umf) The fibres detected may or may not be asbestos fibres.
AN602	AS4964.2004 Method for the Qualitative Identification of Asbestos in Bulk Samples , Section 8.4, Trace Analysis Criteria, Note 4 states:"Depending upon sample condition and fibre type, the detection limit of this technique has been found to lie generally in the range of 1 in 1,000 to 1 in 10,000 parts by weight, equivalent to 1 to 0.1 g/kg."
AN602	The sample can be reported “no asbestos found at the reporting limit of 0.1 g/kg” (<0.01%w/w) where AN602 section 4.5 of this method has been followed, and if- (a) no trace asbestos fibres have been detected (i.e. no ‘respirable’ fibres): (b) the estimated weight of non-respirable asbestos fibre bundles and/or the estimated weight of asbestos in asbestos-containing materials are found to be less than 0.1g/kg: and (c) these non-respirable asbestos fibre bundles and/or the asbestos containing materials are only visible under stereo-microscope viewing conditions.
AN605	This technique gravimetrically determines the mass of Asbestos Containing Material retained on a 7mm Sieve and assumes that 15% of this ACM is asbestos. This calculated asbestos weight is then calculated as a percentage of the total sample weight.
AN605	This technique also gravimetrically determines the mass of Fibrous Asbestos (FA) and Asbestos Fines (AF) Containing Material retained on and passing a 2mm sieve post 7mm sieving. Assumes that FA and AF are 100% asbestos containing. This calculated asbestos weight is then calculated as a percentage of the total sample weight. This does not include free fibres which are only observed by standard trace analysis as per AN 602.
AN605	Insofar as is technically feasible, this report is consistent with the analytical reporting recommendations in the Western Australian Department of Health Guidelines for the Assessment Remediation and Management of Asbestos - Contaminated Sites in Western Australia - May 2009.

FOOTNOTES

Amosite	-	Brown Asbestos	NA	-	Not Analysed
Chrysotile	-	White Asbestos	LNR	-	Listed, Not Required
Crocidolite	-	Blue Asbestos	*	-	NATA accreditation does not cover the performance of this service .
Amphiboles	-	Amosite and/or Crocidolite	**	-	Indicative data, theoretical holding time exceeded.

(In reference to soil samples only) This report does not comply with the analytical reporting recommendations in the Western Australian Department of Health Guidelines for the Assessment and Remediation and Management of Asbestos Contaminated sites in Western Australia - May 2009.

Unless it is reported that sampling has been perfomed by SGS, the samples have been analysed as received.

Where reported: 'Asbestos Detected': Asbestos detected by polarised light microscopy, including dispersion staining.
Where reported: 'No Asbestos Found': No Asbestos Found by polarised light microscopy, including dispersion staining.
Where reported: 'UMF Detected': Mineral fibres of unknown type detected by polarised light microscopy, including dispersion staining. Confirmation by another independent analytical technique may be necessary.

Even after disintegration it can be very difficult, or impossible, to detect the presence of asbestos in some asbestos -containing bulk materials using polarised light microscopy. This is due to the low grade or small length or diameter of asbestos fibres present in the material, or to the fact that very fine fibres have been distributed intimately throughout the materials.

The QC and MU criteria are subject to internal review according to the SGS QAQC plan and may be provided on request or alternatively can be found here: www.sgs.com.au.pv.sgsvr/en-gb/environment.

Occupational Hygiene
Health Safety &
Environmental Consulting

CHAIN OF CUSTODY FORM

Job No. : 10903

From: Robson Environmental Pty Ltd
PO Box 112 Fyshwick ACT 2609
140 Gladstone Street
Fyshwick ACT 2609
ABN [illegible]

Contact: Alex Hannan-Joyner
Phone: (02) 6239 5656
Mobile: 0478 666 406
Fax: (02) 6239 5660
Email: [illegible]

Client Information: EMM

Site Address: Cooma Airstrip
Cooma NSW

Sampled by: AHJ

Job Name:

[illegible] YES

Required Turnaround Time
24hr ☒ 48hr ☐ 5-7 days ☐
36hr ☐ 72hr ☐

To:
SGS
33 Maddox Street
Alexandria NSW 2015

Contact: Irfan Sayeed
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Mobile:0400 588 130
Fax: (02) 8594 0460
Email:
ABN 44 000 964 278

Analysis Required

Lab ID	Sample ID	Sample Depth (m)	Date Sampled	Sample Location	No. of Sample Jars	Sample Type	Sample Preservation (Ice, Acid, Ambient)	CL7	CL17	Perfluorinated Surfactants (PFAS)	Asbestos (WA)	CL4	Comments - Robson Quote Code LVJVAJ & LVM1OX
1	S01_0-0.1	0-0.1	17/04/2019	S01	1 Jar + 1 Bag	Soil	Ice (Jars Only)	X			X		
2	S02_0-0.1	0-0.1	17/04/2019	S02	1 Jar + 1 PFAS + 1 Bag	Soil	Ice (Jars Only)		X	X	X		
3	S02_0.4-0.5	0.4-0.5	17/04/2019	S02	1 Jar + 1 PFAS	Soil	Ice (Jars Only)		X	X			
4	S03_0-0.1	0-0.1	17/04/2019	S03	1 Jar	Soil	Ice (Jars Only)	X					
5	S04_0-0.1	0-0.1	17/04/2019	S04	1 Jar	Soil	Ice (Jars Only)	X					
6	S04_0.4-0.5	0.4-0.5	17/04/2019	S04	1 Jar	Soil	Ice (Jars Only)	X					
7	S05_0-0.1	0-0.1	17/04/2019	S05	1 Jar + 1 PFAS + 1 Bag	Soil	Ice (Jars Only)		X	X	X		
8	S05_0.4-0.5	0.4-0.5	17/04/2019	S05	1 Jar + 1 PFAS	Soil	Ice (Jars Only)		X	X			
9	S06_0-0.1	0-0.1	17/04/2019	S06	1 Jar	Soil	Ice (Jars Only)	X					
10	S06_0.4-0.5	0.4-0.5	17/04/2019	S06	1 Jar	Soil	Ice (Jars Only)	X					
11	S07_0-0.1	0-0.1	17/04/2019	S07	1 Jar + 1 PFAS + 1 Bag	Soil	Ice (Jars Only)		X	X	X		
12	S08_0-0.1	0-0.1	17/04/2019	S08	1 Jar + 1 PFAS + 1 Bag	Soil	Ice (Jars Only)		X	X	X		
13	S08_0.3-0.4	0.3-0.4	17/04/2019	S08	1 Jar + 1 PFAS	Soil	Ice (Jars Only)		X	X			
14	S09_0-0.1	0-0.1	17/04/2019	S09	1 Jar	Soil	Ice (Jars Only)	X					
15	S10_0-0.1	0-0.1	17/04/2019	S10	1 Jar + 1 Bag	Soil	Ice (Jars Only)	X			X		
16	S11_0-0.1	0-0.1	17/04/2019	S11	1 Jar + 1 PFAS + 1 Bag	Soil	Ice (Jars Only)		X	X	X		
17	S11_0.4-0.5	0.4-0.5	17/04/2019	S11	1 Jar + 1 PFAS	Soil	Ice (Jars Only)		X	X			
18	S12_0-0.1	0-0.1	17/04/2019	S12	1 Jar + 1 PFAS + 1 Bag	Soil	Ice (Jars Only)		X	X	X		
19	S13_0-0.1	0-0.1	17/04/2019	S13	1 Jar	Soil	Ice (Jars Only)	X					
20	S14_0-0.1	0-0.1	17/04/2019	S14	1 Jar + 1 PFAS + 1 Bag	Soil	Ice (Jars Only)		X	X	X		
21	S14_0.4-0.5	0.4-0.5	17/04/2019	S14	1 Jar + 1 PFAS	Soil	Ice (Jars Only)		X	X			
22	S15_0-0.1	0-0.1	17/04/2019	S15	1 Jar + 1 PFAS	Soil	Ice (Jars Only)		X	X			
23	S16_0-0.1	0-0.1	17/04/2019	S16	1 Jar + 1 PFAS + 1 Bag	Soil	Ice (Jars Only)		X	X	X		
24	S17_0-0.1	0-0.1	17/04/2019	S17	1 Jar	Soil	Ice (Jars Only)	X					
25	S18_0-0.1	0-0.1	17/04/2019	S18	1 Jar + 1 PFAS + 1 Bag	Soil	Ice (Jars Only)		X	X	X		
26	S19_0-0.1	0-0.1	17/04/2019	S19	1 Jar + 1 PFAS + 1 Bag	Soil	Ice (Jars Only)		X	X	X		
27	S19_0.4-0.5	0.4-0.5	17/04/2019	S19	1 Jar + 1 PFAS	Soil	Ice (Jars Only)		X	X			
28	S20_0-0.1	0-0.1	17/04/2019	S20	1 Jar + 1 PFAS + 1 Bag	Soil	Ice (Jars Only)		X	X	X		
29	S20_0.4-0.5	0.4-0.5	17/04/2019	S20	1 Jar + 1 PFAS	Soil	Ice (Jars Only)		X	X			
30	S21_0-0.1	0-0.1	17/04/2019	S21	1 Jar	Soil	Ice (Jars Only)	X					
31	S22_0-0.1	0-0.1	17/04/2019	S22	1 Jar	Soil	Ice (Jars Only)	X					
32	S23_0-0.1	0-0.1	17/04/2019	S23	1 Jar + 1 PFAS + 1 Bag	Soil	Ice (Jars Only)		X	X	X		
33	S24_0-0.1	0-0.1	17/04/2019	S24	1 Jar + 1 PFAS + 1 Bag	Soil	Ice (Jars Only)		X	X	X		
34	S25_0-0.2	0-0.2	17/04/2019	S25	1 Jar + 1 PFAS + 1 Bag	Soil	Ice (Jars Only)		X	X	X		
35	S26_0-0.2	0-0.2	17/04/2019	S25	1 Jar + 1 PFAS + 1 Bag	Soil	Ice (Jars Only)		X	X	X		
36	QC01		17/04/2019		1 Jar + 1 PFAS	Soil	Ice (Jars Only)		X	X			
37	QC03		17/04/2019		1 Jar + 1 PFAS	Soil	Ice (Jars Only)		X	X			
38	FB01		17/04/2019		2 Vials	Water	Ice (Jars Only)					X	
39	TB01		17/04/2019		1 Vial	Soil	Ice (Jars Only)					X	
40	TS01		17/04/2019		1 Vial	Soil	Ice (Jars Only)					X	
41	Rinsate_170419		17/04/2019		2 Plastics, 1 Amber, 2 Vials	Water	Ice (Jars Only)		X	X			

Relinquished by: AHJ Date: 23/04/2019 Time: 2pm Received by: Time: 24/04/19 @ 4:40
Relinquished by: Date: Time: Received by: Time:
Relinquished by: Date: Time: Received by: Time:

CL6: TRH, BTEX & Pb	CL15: TRH, BTEX, PAH, Phenols, OC, OP, PCB & 8 Heavy Metals	RS3: TRH, BTEX, PAH, Phenols, OCP, PCB, 8 Heavy Metals
CL2: 8 Heavy metals (As, Cd, Cr, Cu, Ni, Pb, Zn, Hg)	Micro 2: E.Coli, Faecal Coliforms, Total Coliforms	

SGS EHS Alexandria Laboratory
SE192028A COC
Received: 24-Apr-2019

ANALYTICAL REPORT

Accreditation No. 2562

CLIENT DETAILS

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Project	**SE192028A**
Order Number	**SE192028A**
Samples	26

LABORATORY DETAILS

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SGS Reference	**ME310282 R0**
Date Received	29 Apr 2019
Date Reported	08 May 2019

COMMENTS

Accredited for compliance with ISO/IEC 17025 - Testing. NATA accredited laboratory 2562(14420).

LC: Surrogate recovery out of range due to matrix interference.

SIGNATORIES

Vanessa Palamara
Chemist

		Sample Number	ME310282.001	ME310282.002	ME310282.003	ME310282.004
		Sample Matrix	Soil	Soil	Soil	Soil
		Sample Date	17 Apr 2019	17 Apr 2019	17 Apr 2019	17 Apr 2019
		Sample Name	S02_0-0.1	S02_0-4_0.5	S05_0-0.1	S05_0.4-0.5
Parameter	Units	LOR				
Per- and Polyfluoroalkyl Substances (PFAS) in Solid Samples- Low level Method: MA-1523 Tested: 1/5/2019						
Perfluorobutanoic acid (PFBA)	mg/kg	0.0001	<0.0001	<0.0001	**0.0001**	<0.0001
Perfluoropentanoic acid (PFPeA)	mg/kg	0.0005	<0.0005	<0.0005	<0.0005	<0.0005
Perfluorohexanoic acid (PFHxA)	mg/kg	0.0001	<0.0001	<0.0001	<0.0001	<0.0001
Perfluoroheptanoic acid (PFHpA)	mg/kg	0.0001	<0.0001	<0.0001	<0.0001	<0.0001
Perfluorooctanoic Acid (PFOA)	mg/kg	0.0001	<0.0001	<0.0001	<0.0001	**0.0002**
Perfluorononanoic acid (PFNA)	mg/kg	0.0001	<0.0001	<0.0001	<0.0001	<0.0001
Perfluorodecanoic acid (PFDA)	mg/kg	0.0001	<0.0001	<0.0001	<0.0001	<0.0001
Perfluoroundecanoic acid (PFUnA)	mg/kg	0.0001	<0.0001	<0.0001	<0.0001	<0.0001
Perfluorododecanoic acid (PFDoA)	mg/kg	0.0001	<0.0001	<0.0001	<0.0001	<0.0001
Perfluorotridecanoic acid (PFTrDA)	mg/kg	0.0001	<0.0001	<0.0001	<0.0001	<0.0001
Perfluorotetradecanoic acid (PFTeDA)	mg/kg	0.0001	<0.0001	<0.0001	<0.0001	<0.0001
Perfluorohexadecanoic acid (PFHxDA)	mg/kg	0.0001	<0.0001	<0.0001	<0.0001	<0.0001
Perfluorobutane sulfonate (PFBS)	mg/kg	0.0001	<0.0001	<0.0001	<0.0001	<0.0001
Perfluoropentane sulfonate (PFPeS)	mg/kg	0.0001	<0.0001	<0.0001	<0.0001	<0.0001
Perfluorohexane sulfonate (PFHxS)	mg/kg	0.0001	<0.0001	<0.0001	<0.0001	<0.0001
Perfluoroheptane sulfonate (PFHpS)	mg/kg	0.0001	<0.0001	<0.0001	<0.0001	<0.0001
Perfluorooctane sulfonate (PFOS)	mg/kg	0.0001	**0.0004**	<0.0001	**0.0070**	**0.0007**
Sum PFOS and PFHXS	mg/kg	0.0001	**0.0004**	<0.0001	**0.0070**	**0.0007**
Perfluorononane sulfonate (PFNS)	mg/kg	0.0001	<0.0001	<0.0001	<0.0001	<0.0001
Perfluorodecane sulfonate (PFDS)	mg/kg	0.0001	<0.0001	<0.0001	<0.0001	<0.0001
Perfluorododecane sulfonate (PFDoS)	mg/kg	0.0001	<0.0001	<0.0001	<0.0001	<0.0001
1H,1H,2H,2H-Perfluorohexane sulfonate (4:2) (4:2 FTS)	mg/kg	0.001	<0.001	<0.001	<0.001	<0.001
1H,1H,2H,2H-Perfluorooctane sulfonate (6:2) (6:2 FTS)	mg/kg	0.001	<0.001	<0.001	<0.001	<0.001
1H,1H,2H,2H-Perfluorodecane sulfonate (8:2) (8:2 FTS)	mg/kg	0.001	<0.001	<0.001	<0.001	<0.001
Perfluoroctane sulfonamide (PFOSA)	mg/kg	0.001	<0.001	<0.001	<0.001	<0.001
N-Methylperfluoroctane sulfonamide (N-MeFOSA)	mg/kg	0.001	<0.001	<0.001	<0.001	<0.001
N-Ethylperfluoroctane sulfonamide (N-EtFOSA)	mg/kg	0.001	<0.001	<0.001	<0.001	<0.001
2-(N-Methylperfluorooctane sulfonamido)-ethanol (N-MeFOSE)	mg/kg	0.002	<0.002	<0.002	<0.002	<0.002
2-(N-Ethylperfluorooctane sulfonamido)-ethanol (N-EtFOSE)	mg/kg	0.002	<0.002	<0.002	<0.002	<0.002
N-Methylperfluorooctanesulfonamidoacetic acid (N_MeFOSAA)	mg/kg	0.001	<0.001	<0.001	<0.001	<0.001
N-Ethylperfluorooctanesulfonamidoacetic Acid (N-EtFOSAA)	mg/kg	0.001	<0.001	<0.001	<0.001	<0.001
(13C4-PFBA) Surrogate	%	-	**53**	**182**	**65**	**63**
(13C5_PFPeA) Surrogate	%	-	**64**	**260**	**88**	**68**
(13C5-PFHxA) Surrogate	%	-	**56**	**168**	**83**	**74**
(13C4-PFHpA) Surrogate	%	-	**63**	**118**	**83**	**60**
(13C4-PFOA) Surrogate	%	-	**49**	**156**	**59**	**58**
(13C9-PFNA) Surrogate	%	-	**65**	**146**	**71**	**57**
(13C6-PFDA) Surrogate	%	-	**53**	**76**	**63**	**52**
(13C7-PFUdA) Surrogate	%	-	**22**	**99**	**47**	**41**
(13C2-PFDoA) Surrogate	%	-	**35**	**71**	**35**	**35**
(13C2-PFTeDA) Surrogate	%	-	**27**	**62**	**32**	**29**
(13C2-PFHxDA) Surrogate	%	-	**26**	**75**	**22**	**29**
(13C3-PFBS) Surrogate	%	-	**55**	**172**	**65**	**54**
(13C3-PFHxS) Surrogate	%	-	**55**	**188**	**59**	**48**
(13C8-PFOS) Surrogate	%	-	**50**	**158**	**53**	**55**
(13C2-4:2FTS) Surrogate	%	-	**47**	**174**	**56**	**43**
(13C2-6:2FTS) Surrogate	%	-	**72**	**208**	**111**	**71**
(13C2-8:2FTS) Surrogate	%	-	**58**	**168**	**91**	**59**
(13C8-PFOSA) Surrogate	%	-	**25**	**125**	**22**	**41**
(D3-N-MeFOSA) Surrogate	%	-	**17**	**67**	**12**	**17**
(D5-N-EtFOSA) Surrogate	%	-	**15**	**58**	**10**	**15**
(D7-N-MeFOSE) Surrogate	%	-	**30**	**147**	**30**	**33**
(D9-N-EtFOSE) Surrogate	%	-	**21**	**96**	**14**	**23**
(D3-N-MeFOSAA) Surrogate	%	-	**35**	**123**	**38**	**49**
(D5-N-EtFOSAA) Surrogate	%	-	**20**	**128**	**40**	**51**

Per- and Polyfluoroalkyl Substances (PFAS) in Aqueous Samples Method: MA-1523 Tested: 3/5/2019

Per- and Polyfluoroalkyl Substances (PFAS) in Aqueous Samples Method: MA-1523 Tested: 3/5/2019 (continued)

		Sample Number	ME310282.001	ME310282.002	ME310282.003	ME310282.004
		Sample Matrix	Soil	Soil	Soil	Soil
		Sample Date	17 Apr 2019	17 Apr 2019	17 Apr 2019	17 Apr 2019
		Sample Name	S02_0-0.1	S02_0-4_0.5	S05_0-0.1	S05_0.4-0.5
Parameter	**Units**	**LOR**				
Perfluorobutanoic acid (PFBA)	µg/L	0.002	-	-	-	-
Perfluoropentanoic acid (PFPeA)	µg/L	0.002	-	-	-	-
Perfluorohexanoic acid (PFHxA)	µg/L	0.002	-	-	-	-
Perfluoroheptanoic acid (PFHpA)	µg/L	0.002	-	-	-	-
Perfluorooctanoic Acid (PFOA)	µg/L	0.001	-	-	-	-
Perfluorononanoic acid (PFNA)	µg/L	0.004	-	-	-	-
Perfluorodecanoic acid (PFDA)	µg/L	0.004	-	-	-	-
Perfluoroundecanoic acid (PFUnA)	µg/L	0.004	-	-	-	-
Perfluorododecanoic acid (PFDoA)	µg/L	0.004	-	-	-	-
Perfluorotridecanoic acid (PFTrDA)	µg/L	0.004	-	-	-	-
Perfluorotetradecanoic acid (PFTeDA)	µg/L	0.004	-	-	-	-
Perfluorohexadecanoic acid (PFHxDA)	µg/L	0.008	-	-	-	-
Perfluorobutane sulfonate (PFBS)	µg/L	0.004	-	-	-	-
Perfluoropentane sulfonate (PFPeS)	µg/L	0.004	-	-	-	-
Perfluorohexane sulfonate (PFHxS)	µg/L	0.002	-	-	-	-
Perfluoroheptane sulfonate (PFHpS)	µg/L	0.002	-	-	-	-
Perfluorooctane sulfonate (PFOS)	µg/L	0.002	-	-	-	-
Sum of PFHxS and PFOS	µg/L	0.002	-	-	-	-
Perfluorononane sulfonate (PFNS)	µg/L	0.002	-	-	-	-
Perfluorodecane sulfonate (PFDS)	µg/L	0.002	-	-	-	-
Perfluorododecane sulfonate (PFDoS)	µg/L	0.002	-	-	-	-
1H,1H,2H,2H-Perfluorohexane sulfonate (4:2) (4:2 FTS)	µg/L	0.002	-	-	-	-
1H,1H,2H,2H-Perfluorooctane sulfonate (6:2) (6:2 FTS)	µg/L	0.002	-	-	-	-
1H,1H,2H,2H-Perfluorodecane sulfonate (8:2) (8:2 FTS)	µg/L	0.002	-	-	-	-
Perfluoroctane sulfonamide (PFOSA)	µg/L	0.008	-	-	-	-
N-Methylperfluoroctane sulfonamide (N-MeFOSA)	µg/L	0.01	-	-	-	-
N-Ethylperfluoroctane sulfonamide (N-EtFOSA)	µg/L	0.01	-	-	-	-
2-(N-Methylperfluorooctane sulfonamido)-ethanol (N-MeFOSE)	µg/L	0.01	-	-	-	-
2-(N-Ethylperfluorooctane sulfonamido)-ethanol (N-EtFOSE)	µg/L	0.01	-	-	-	-
N-Methylperfluorooctanesulfonamidoacetic acid (N_MeFOSAA)	µg/L	0.01	-	-	-	-
N-Ethylperfluorooctanesulfonamidoacetic Acid (N-EtFOSAA)	µg/L	0.01	-	-	-	-
(13C4-PFBA) Surrogate	%	-	-	-	-	-
(13C5-PFPeA) Surrogate	%	-	-	-	-	-
(13C5-PFHxA) Surrogate	%	-	-	-	-	-
(13C4-PFHpA) Surrogate	%	-	-	-	-	-
(13C4_PFOA) Surrogate	%	-	-	-	-	-
(13C9-PFNA) Surrogate	%	-	-	-	-	-
(13C6-PFDA) Surrogate	%	-	-	-	-	-
(13C7-PFUdA) Surrogate	%	-	-	-	-	-
(13C2-PFDoA) Surrogate	%	-	-	-	-	-
(13C2_PFTeDA) Surrogate	%	-	-	-	-	-
(13C2-PFHxDA) Surrogate	%	-	-	-	-	-
(13C3-PFBS) Surrogate	%	-	-	-	-	-
(13C3-PFHxS) Surrogate	%	-	-	-	-	-
(13C8-PFOS) Surrogate	%	-	-	-	-	-
(13C2-4:2 FTS) Surrogate	%	-	-	-	-	-
(13C2-6:2 FTS) Surrogate	%	-	-	-	-	-
(13C2-8:2 FTS) Surrogate	%	-	-	-	-	-
(13C8-PFOSA) Surrogate	%	-	-	-	-	-
(D3-N-MeFOSA) Surrogate	%	-	-	-	-	-
(D5-N-EtFOSA) Surrogate	%	-	-	-	-	-
(D7-N-MeFOSE) Surrogate	%	-	-	-	-	-
(D9-N-EtFOSE) Surrogate	%	-	-	-	-	-
(D3-N-MeFOSAA) Surrogate	%	-	-	-	-	-
(D5-N-EtFOSAA) Surrogate	%	-	-	-	-	-

Moisture Content Method: AN002 Tested: 2/5/2019

Parameter	Units	LOR	Sample Number Sample Matrix Sample Date Sample Name	ME310282.001 Soil 17 Apr 2019 S02_0-0.1	ME310282.002 Soil 17 Apr 2019 S02_0-4_0.5	ME310282.003 Soil 17 Apr 2019 S05_0-0.1	ME310282.004 Soil 17 Apr 2019 S05_0.4-0.5
Moisture Content Method: AN002 Tested: 2/5/2019 (continued)							
% Moisture*	%w/w	1		4.3	26.4	30.9	21.4

		Sample Number	ME310282.005	ME310282.006	ME310282.007	ME310282.008
		Sample Matrix	Soil	Soil	Soil	Soil
		Sample Date	17 Apr 2019	17 Apr 2019	17 Apr 2019	17 Apr 2019
		Sample Name	S07_0-0.1	S08_0-0.1	S08_0.3-0.4	S11_0-0.1
Parameter	Units	LOR				
Per- and Polyfluoroalkyl Substances (PFAS) in Solid Samples- Low level Method: MA-1523 Tested: 1/5/2019						
Perfluorobutanoic acid (PFBA)	mg/kg	0.0001	<0.0001	<0.0001	<0.0001	<0.0001
Perfluoropentanoic acid (PFPeA)	mg/kg	0.0005	<0.0005	<0.0005	<0.0005	<0.0005
Perfluorohexanoic acid (PFHxA)	mg/kg	0.0001	<0.0001	<0.0001	<0.0001	<0.0001
Perfluoroheptanoic acid (PFHpA)	mg/kg	0.0001	<0.0001	<0.0001	<0.0001	<0.0001
Perfluorooctanoic Acid (PFOA)	mg/kg	0.0001	<0.0001	<0.0001	<0.0001	**0.0002**
Perfluorononanoic acid (PFNA)	mg/kg	0.0001	<0.0001	<0.0001	<0.0001	<0.0001
Perfluorodecanoic acid (PFDA)	mg/kg	0.0001	<0.0001	<0.0001	<0.0001	<0.0001
Perfluoroundecanoic acid (PFUnA)	mg/kg	0.0001	<0.0001	<0.0001	<0.0001	<0.0001
Perfluorododecanoic acid (PFDoA)	mg/kg	0.0001	<0.0001	<0.0001	<0.0001	<0.0001
Perfluorotridecanoic acid (PFTrDA)	mg/kg	0.0001	<0.0001	<0.0001	<0.0001	<0.0001
Perfluorotetradecanoic acid (PFTeDA)	mg/kg	0.0001	<0.0001	<0.0001	<0.0001	<0.0001
Perfluorohexadecanoic acid (PFHxDA)	mg/kg	0.0001	<0.0001	<0.0001	<0.0001	<0.0001
Perfluorobutane sulfonate (PFBS)	mg/kg	0.0001	<0.0001	<0.0001	<0.0001	<0.0001
Perfluoropentane sulfonate (PFPeS)	mg/kg	0.0001	<0.0001	<0.0001	<0.0001	<0.0001
Perfluorohexane sulfonate (PFHxS)	mg/kg	0.0001	<0.0001	<0.0001	<0.0001	<0.0001
Perfluoroheptane sulfonate (PFHpS)	mg/kg	0.0001	<0.0001	<0.0001	<0.0001	<0.0001
Perfluorooctane sulfonate (PFOS)	mg/kg	0.0001	**0.0002**	<0.0001	<0.0001	**0.0032**
Sum PFOS and PFHXS	mg/kg	0.0001	**0.0002**	<0.0001	<0.0001	**0.0032**
Perfluorononane sulfonate (PFNS)	mg/kg	0.0001	<0.0001	<0.0001	<0.0001	<0.0001
Perfluorodecane sulfonate (PFDS)	mg/kg	0.0001	<0.0001	<0.0001	<0.0001	<0.0001
Perfluorododecane sulfonate (PFDoS)	mg/kg	0.0001	<0.0001	<0.0001	<0.0001	<0.0001
1H,1H,2H,2H-Perfluorohexane sulfonate (4:2) (4:2 FTS)	mg/kg	0.001	<0.001	<0.001	<0.001	<0.001
1H,1H,2H,2H-Perfluorooctane sulfonate (6:2) (6:2 FTS)	mg/kg	0.001	<0.001	<0.001	<0.001	<0.001
1H,1H,2H,2H-Perfluorodecane sulfonate (8:2) (8:2 FTS)	mg/kg	0.001	<0.001	<0.001	<0.001	<0.001
Perfluoroctane sulfonamide (PFOSA)	mg/kg	0.001	<0.001	<0.001	<0.001	<0.001
N-Methylperfluoroctane sulfonamide (N-MeFOSA)	mg/kg	0.001	<0.001	<0.001	<0.001	<0.001
N-Ethylperfluoroctane sulfonamide (N-EtFOSA)	mg/kg	0.001	<0.001	<0.001	<0.001	<0.001
2-(N-Methylperfluorooctane sulfonamido)-ethanol (N-MeFOSE)	mg/kg	0.002	<0.002	<0.002	<0.002	<0.002
2-(N-Ethylperfluorooctane sulfonamido)-ethanol (N-EtFOSE)	mg/kg	0.002	<0.002	<0.002	<0.002	<0.002
N-Methylperfluorooctanesulfonamidoacetic acid (N_MeFOSAA)	mg/kg	0.001	<0.001	<0.001	<0.001	<0.001
N-Ethylperfluorooctanesulfonamidoacetic Acid (N-EtFOSAA)	mg/kg	0.001	<0.001	<0.001	<0.001	<0.001
(13C4-PFBA) Surrogate	%	-	**65**	**50**	**52**	**54**
(13C5_PFPeA) Surrogate	%	-	**69**	**69**	**54**	**59**
(13C5-PFHxA) Surrogate	%	-	**58**	**69**	**53**	**68**
(13C4-PFHpA) Surrogate	%	-	**86**	**85**	**49**	**70**
(13C4-PFOA) Surrogate	%	-	**48**	**61**	**58**	**44**
(13C9-PFNA) Surrogate	%	-	**70**	**47**	**42**	**61**
(13C6-PFDA) Surrogate	%	-	**69**	**61**	**50**	**58**
(13C7-PFUdA) Surrogate	%	-	**56**	**25**	**45**	**38**
(13C2-PFDoA) Surrogate	%	-	**40**	**37**	**29**	**31**
(13C2-PFTeDA) Surrogate	%	-	**35**	**37**	**24**	**23**
(13C2-PFHxDA) Surrogate	%	-	**31**	**36**	**32**	**19**
(13C3-PFBS) Surrogate	%	-	**58**	**55**	**61**	**49**
(13C3-PFHxS) Surrogate	%	-	**59**	**52**	**58**	**49**
(13C8-PFOS) Surrogate	%	-	**73**	**53**	**57**	**45**
(13C2-4:2FTS) Surrogate	%	-	**55**	**48**	**60**	**44**
(13C2-6:2FTS) Surrogate	%	-	**104**	**70**	**71**	**89**
(13C2-8:2FTS) Surrogate	%	-	**92**	**54**	**60**	**67**
(13C8-PFOSA) Surrogate	%	-	**37**	**24**	**37**	**26**
(D3-N-MeFOSA) Surrogate	%	-	**20**	**19**	**16**	**17**
(D5-N-EtFOSA) Surrogate	%	-	**16**	**12**	**13**	**13**
(D7-N-MeFOSE) Surrogate	%	-	**40**	**21**	**36**	**37**
(D9-N-EtFOSE) Surrogate	%	-	**27**	**15**	**20**	**9**
(D3-N-MeFOSAA) Surrogate	%	-	**56**	**30**	**47**	**40**
(D5-N-EtFOSAA) Surrogate	%	-	**52**	**19**	**43**	**40**

Per- and Polyfluoroalkyl Substances (PFAS) in Aqueous Samples Method: MA-1523 Tested: 3/5/2019

Parameter	Units	LOR	Sample Number ME310282.005 Sample Matrix Soil Sample Date 17 Apr 2019 Sample Name S07_0-0.1	ME310282.006 Soil 17 Apr 2019 S08_0-0.1	ME310282.007 Soil 17 Apr 2019 S08_0.3-0.4	ME310282.008 Soil 17 Apr 2019 S11_0-0.1

Per- and Polyfluoroalkyl Substances (PFAS) in Aqueous Samples Method: MA-1523 Tested: 3/5/2019 (continued)

Perfluorobutanoic acid (PFBA)	µg/L	0.002	-	-	-	-
Perfluoropentanoic acid (PFPeA)	µg/L	0.002	-	-	-	-
Perfluorohexanoic acid (PFHxA)	µg/L	0.002	-	-	-	-
Perfluoroheptanoic acid (PFHpA)	µg/L	0.002	-	-	-	-
Perfluorooctanoic Acid (PFOA)	µg/L	0.001	-	-	-	-
Perfluorononanoic acid (PFNA)	µg/L	0.004	-	-	-	-
Perfluorodecanoic acid (PFDA)	µg/L	0.004	-	-	-	-
Perfluoroundecanoic acid (PFUnA)	µg/L	0.004	-	-	-	-
Perfluorododecanoic acid (PFDoA)	µg/L	0.004	-	-	-	-
Perfluorotridecanoic acid (PFTrDA)	µg/L	0.004	-	-	-	-
Perfluorotetradecanoic acid (PFTeDA)	µg/L	0.004	-	-	-	-
Perfluorohexadecanoic acid (PFHxDA)	µg/L	0.008	-	-	-	-
Perfluorobutane sulfonate (PFBS)	µg/L	0.004	-	-	-	-
Perfluoropentane sulfonate (PFPeS)	µg/L	0.004	-	-	-	-
Perfluorohexane sulfonate (PFHxS)	µg/L	0.002	-	-	-	-
Perfluoroheptane sulfonate (PFHpS)	µg/L	0.002	-	-	-	-
Perfluorooctane sulfonate (PFOS)	µg/L	0.002	-	-	-	-
Sum of PFHxS and PFOS	µg/L	0.002	-	-	-	-
Perfluorononane sulfonate (PFNS)	µg/L	0.002	-	-	-	-
Perfluorodecane sulfonate (PFDS)	µg/L	0.002	-	-	-	-
Perfluorododecane sulfonate (PFDoS)	µg/L	0.002	-	-	-	-
1H,1H,2H,2H-Perfluorohexane sulfonate (4:2) (4:2 FTS)	µg/L	0.002	-	-	-	-
1H,1H,2H,2H-Perfluorooctane sulfonate (6:2) (6:2 FTS)	µg/L	0.002	-	-	-	-
1H,1H,2H,2H-Perfluorodecane sulfonate (8:2) (8:2 FTS)	µg/L	0.002	-	-	-	-
Perfluoroctane sulfonamide (PFOSA)	µg/L	0.008	-	-	-	-
N-Methylperfluoroctane sulfonamide (N-MeFOSA)	µg/L	0.01	-	-	-	-
N-Ethylperfluoroctane sulfonamide (N-EtFOSA)	µg/L	0.01	-	-	-	-
2-(N-Methylperfluorooctane sulfonamido)-ethanol (N-MeFOSE)	µg/L	0.01	-	-	-	-
2-(N-Ethylperfluorooctane sulfonamido)-ethanol (N-EtFOSE)	µg/L	0.01	-	-	-	-
N-Methylperfluorooctanesulfonamidoacetic acid (N_MeFOSAA)	µg/L	0.01	-	-	-	-
N-Ethylperfluorooctanesulfonamidoacetic Acid (N-EtFOSAA)	µg/L	0.01	-	-	-	-
(13C4-PFBA) Surrogate	%	-	-	-	-	-
(13C5-PFPeA) Surrogate	%	-	-	-	-	-
(13C5-PFHxA) Surrogate	%	-	-	-	-	-
(13C4-PFHpA) Surrogate	%	-	-	-	-	-
(13C4_PFOA) Surrogate	%	-	-	-	-	-
(13C9-PFNA) Surrogate	%	-	-	-	-	-
(13C6-PFDA) Surrogate	%	-	-	-	-	-
(13C7-PFUdA) Surrogate	%	-	-	-	-	-
(13C2-PFDoA) Surrogate	%	-	-	-	-	-
(13C2_PFTeDA) Surrogate	%	-	-	-	-	-
(13C2-PFHxDA) Surrogate	%	-	-	-	-	-
(13C3-PFBS) Surrogate	%	-	-	-	-	-
(13C3-PFHxS) Surrogate	%	-	-	-	-	-
(13C8-PFOS) Surrogate	%	-	-	-	-	-
(13C2-4:2 FTS) Surrogate	%	-	-	-	-	-
(13C2-6:2 FTS) Surrogate	%	-	-	-	-	-
(13C2-8:2 FTS) Surrogate	%	-	-	-	-	-
(13C8-PFOSA) Surrogate	%	-	-	-	-	-
(D3-N-MeFOSA) Surrogate	%	-	-	-	-	-
(D5-N-EtFOSA) Surrogate	%	-	-	-	-	-
(D7-N-MeFOSE) Surrogate	%	-	-	-	-	-
(D9-N-EtFOSE) Surrogate	%	-	-	-	-	-
(D3-N-MeFOSAA) Surrogate	%	-	-	-	-	-
(D5-N-EtFOSAA) Surrogate	%	-	-	-	-	-

Moisture Content Method: AN002 Tested: 2/5/2019

Parameter	Units	LOR	ME310282.005 Soil 17 Apr 2019 S07_0-0.1	ME310282.006 Soil 17 Apr 2019 S08_0-0.1	ME310282.007 Soil 17 Apr 2019 S08_0.3-0.4	ME310282.008 Soil 17 Apr 2019 S11_0-0.1
Sample Number Sample Matrix Sample Date Sample Name						

Moisture Content   Method: AN002   Tested: 2/5/2019   (continued)

% Moisture*	%w/w	1	2.7	4.3	4.2	20.7

		Sample Number	ME310282.009	ME310282.010	ME310282.011	ME310282.012
		Sample Matrix	Soil	Soil	Soil	Soil
		Sample Date	17 Apr 2019	17 Apr 2019	17 Apr 2019	17 Apr 2019
		Sample Name	S11_0.4-0.5	S12_0-0.1	S14_0-0.1	S14_0.4-0.5
Parameter	Units	LOR				

Per- and Polyfluoroalkyl Substances (PFAS) in Solid Samples- Low level Method: MA-1523 Tested: 1/5/2019

Perfluorobutanoic acid (PFBA)	mg/kg	0.0001	<0.0001	<0.0001	**0.0003**	<0.0001
Perfluoropentanoic acid (PFPeA)	mg/kg	0.0005	<0.0005	<0.0005	<0.0005	<0.0005
Perfluorohexanoic acid (PFHxA)	mg/kg	0.0001	<0.0001	<0.0001	<0.0001	<0.0001
Perfluoroheptanoic acid (PFHpA)	mg/kg	0.0001	<0.0001	<0.0001	<0.0001	<0.0001
Perfluorooctanoic Acid (PFOA)	mg/kg	0.0001	<0.0001	<0.0001	<0.0001	<0.0001
Perfluorononanoic acid (PFNA)	mg/kg	0.0001	<0.0001	<0.0001	<0.0001	<0.0001
Perfluorodecanoic acid (PFDA)	mg/kg	0.0001	<0.0001	<0.0001	<0.0001	<0.0001
Perfluoroundecanoic acid (PFUnA)	mg/kg	0.0001	<0.0001	<0.0001	<0.0001	<0.0001
Perfluorododecanoic acid (PFDoA)	mg/kg	0.0001	<0.0001	<0.0001	<0.0001	<0.0001
Perfluorotridecanoic acid (PFTrDA)	mg/kg	0.0001	<0.0001	<0.0001	<0.0001	<0.0001
Perfluorotetradecanoic acid (PFTeDA)	mg/kg	0.0001	<0.0001	<0.0001	<0.0001	<0.0001
Perfluorohexadecanoic acid (PFHxDA)	mg/kg	0.0001	<0.0001	<0.0001	<0.0001	<0.0001
Perfluorobutane sulfonate (PFBS)	mg/kg	0.0001	<0.0001	<0.0001	<0.0001	<0.0001
Perfluoropentane sulfonate (PFPeS)	mg/kg	0.0001	<0.0001	<0.0001	<0.0001	<0.0001
Perfluorohexane sulfonate (PFHxS)	mg/kg	0.0001	**0.0001**	<0.0001	<0.0001	<0.0001
Perfluoroheptane sulfonate (PFHpS)	mg/kg	0.0001	<0.0001	<0.0001	<0.0001	<0.0001
Perfluorooctane sulfonate (PFOS)	mg/kg	0.0001	**0.0002**	**0.0004**	**0.0004**	<0.0001
Sum PFOS and PFHXS	mg/kg	0.0001	**0.0003**	**0.0004**	**0.0004**	<0.0001
Perfluorononane sulfonate (PFNS)	mg/kg	0.0001	<0.0001	<0.0001	<0.0001	<0.0001
Perfluorodecane sulfonate (PFDS)	mg/kg	0.0001	<0.0001	<0.0001	<0.0001	<0.0001
Perfluorododecane sulfonate (PFDoS)	mg/kg	0.0001	<0.0001	<0.0001	<0.0001	<0.0001
1H,1H,2H,2H-Perfluorohexane sulfonate (4:2) (4:2 FTS)	mg/kg	0.001	<0.001	<0.001	<0.001	<0.001
1H,1H,2H,2H-Perfluorooctane sulfonate (6:2) (6:2 FTS)	mg/kg	0.001	<0.001	<0.001	<0.001	<0.001
1H,1H,2H,2H-Perfluorodecane sulfonate (8:2) (8:2 FTS)	mg/kg	0.001	<0.001	<0.001	<0.001	<0.001
Perfluoroctane sulfonamide (PFOSA)	mg/kg	0.001	<0.001	<0.001	<0.001	<0.001
N-Methylperfluoroctane sulfonamide (N-MeFOSA)	mg/kg	0.001	<0.001	<0.001	<0.001	<0.001
N-Ethylperfluoroctane sulfonamide (N-EtFOSA)	mg/kg	0.001	<0.001	<0.001	<0.001	<0.001
2-(N-Methylperfluorooctane sulfonamido)-ethanol (N-MeFOSE)	mg/kg	0.002	<0.002	<0.002	<0.002	<0.002
2-(N-Ethylperfluorooctane sulfonamido)-ethanol (N-EtFOSE)	mg/kg	0.002	<0.002	<0.002	<0.002	<0.002
N-Methylperfluorooctanesulfonamidoacetic acid (N_MeFOSAA)	mg/kg	0.001	<0.001	<0.001	<0.001	<0.001
N-Ethylperfluorooctanesulfonamidoacetic Acid (N-EtFOSAA)	mg/kg	0.001	<0.001	<0.001	<0.001	<0.001
(13C4-PFBA) Surrogate	%	-	53	62	44	30
(13C5_PFPeA) Surrogate	%	-	61	60	41	53
(13C5-PFHxA) Surrogate	%	-	62	99	49	48
(13C4-PFHpA) Surrogate	%	-	52	90	53	50
(13C4-PFOA) Surrogate	%	-	52	61	44	51
(13C9-PFNA) Surrogate	%	-	53	63	49	41
(13C6-PFDA) Surrogate	%	-	41	56	42	32
(13C7-PFUdA) Surrogate	%	-	39	39	40	26
(13C2-PFDoA) Surrogate	%	-	33	38	29	23
(13C2-PFTeDA) Surrogate	%	-	25	32	24	18
(13C2-PFHxDA) Surrogate	%	-	22	28	23	19
(13C3-PFBS) Surrogate	%	-	58	62	47	45
(13C3-PFHxS) Surrogate	%	-	59	58	45	41
(13C8-PFOS) Surrogate	%	-	54	58	41	37
(13C2-4:2FTS) Surrogate	%	-	52	54	42	45
(13C2-6:2FTS) Surrogate	%	-	76	101	70	53
(13C2-8:2FTS) Surrogate	%	-	58	70	64	38
(13C8-PFOSA) Surrogate	%	-	36	34	28	31
(D3-N-MeFOSA) Surrogate	%	-	20	17	16	10
(D5-N-EtFOSA) Surrogate	%	-	15	16	12	9
(D7-N-MeFOSE) Surrogate	%	-	31	40	35	20
(D9-N-EtFOSE) Surrogate	%	-	24	16	17	21
(D3-N-MeFOSAA) Surrogate	%	-	41	49	37	28
(D5-N-EtFOSAA) Surrogate	%	-	46	32	44	32

Per- and Polyfluoroalkyl Substances (PFAS) in Aqueous Samples Method: MA-1523 Tested: 3/5/2019

Parameter	Units	LOR	ME310282.009 Soil 17 Apr 2019 S11_0.4-0.5	ME310282.010 Soil 17 Apr 2019 S12_0-0.1	ME310282.011 Soil 17 Apr 2019 S14_0-0.1	ME310282.012 Soil 17 Apr 2019 S14_0.4-0.5
Sample Number / Sample Matrix / Sample Date / Sample Name						

Per- and Polyfluoroalkyl Substances (PFAS) in Aqueous Samples Method: MA-1523 Tested: 3/5/2019 (continued)

Parameter	Units	LOR	ME310282.009	ME310282.010	ME310282.011	ME310282.012
Perfluorobutanoic acid (PFBA)	µg/L	0.002	-	-	-	-
Perfluoropentanoic acid (PFPeA)	µg/L	0.002	-	-	-	-
Perfluorohexanoic acid (PFHxA)	µg/L	0.002	-	-	-	-
Perfluoroheptanoic acid (PFHpA)	µg/L	0.002	-	-	-	-
Perfluorooctanoic Acid (PFOA)	µg/L	0.001	-	-	-	-
Perfluorononanoic acid (PFNA)	µg/L	0.004	-	-	-	-
Perfluorodecanoic acid (PFDA)	µg/L	0.004	-	-	-	-
Perfluoroundecanoic acid (PFUnA)	µg/L	0.004	-	-	-	-
Perfluorododecanoic acid (PFDoA)	µg/L	0.004	-	-	-	-
Perfluorotridecanoic acid (PFTrDA)	µg/L	0.004	-	-	-	-
Perfluorotetradecanoic acid (PFTeDA)	µg/L	0.004	-	-	-	-
Perfluorohexadecanoic acid (PFHxDA)	µg/L	0.008	-	-	-	-
Perfluorobutane sulfonate (PFBS)	µg/L	0.004	-	-	-	-
Perfluoropentane sulfonate (PFPeS)	µg/L	0.004	-	-	-	-
Perfluorohexane sulfonate (PFHxS)	µg/L	0.002	-	-	-	-
Perfluoroheptane sulfonate (PFHpS)	µg/L	0.002	-	-	-	-
Perfluorooctane sulfonate (PFOS)	µg/L	0.002	-	-	-	-
Sum of PFHxS and PFOS	µg/L	0.002	-	-	-	-
Perfluorononane sulfonate (PFNS)	µg/L	0.002	-	-	-	-
Perfluorodecane sulfonate (PFDS)	µg/L	0.002	-	-	-	-
Perfluorododecane sulfonate (PFDoS)	µg/L	0.002	-	-	-	-
1H,1H,2H,2H-Perfluorohexane sulfonate (4:2) (4:2 FTS)	µg/L	0.002	-	-	-	-
1H,1H,2H,2H-Perfluorooctane sulfonate (6:2) (6:2 FTS)	µg/L	0.002	-	-	-	-
1H,1H,2H,2H-Perfluorodecane sulfonate (8:2) (8:2 FTS)	µg/L	0.002	-	-	-	-
Perfluoroctane sulfonamide (PFOSA)	µg/L	0.008	-	-	-	-
N-Methylperfluoroctane sulfonamide (N-MeFOSA)	µg/L	0.01	-	-	-	-
N-Ethylperfluoroctane sulfonamide (N-EtFOSA)	µg/L	0.01	-	-	-	-
2-(N-Methylperfluorooctane sulfonamido)-ethanol (N-MeFOSE)	µg/L	0.01	-	-	-	-
2-(N-Ethylperfluorooctane sulfonamido)-ethanol (N-EtFOSE)	µg/L	0.01	-	-	-	-
N-Methylperfluorooctanesulfonamidoacetic acid (N_MeFOSAA)	µg/L	0.01	-	-	-	-
N-Ethylperfluorooctanesulfonamidoacetic Acid (N-EtFOSAA)	µg/L	0.01	-	-	-	-
(13C4-PFBA) Surrogate	%	-	-	-	-	-
(13C5-PFPeA) Surrogate	%	-	-	-	-	-
(13C5-PFHxA) Surrogate	%	-	-	-	-	-
(13C4-PFHpA) Surrogate	%	-	-	-	-	-
(13C4_PFOA) Surrogate	%	-	-	-	-	-
(13C9-PFNA) Surrogate	%	-	-	-	-	-
(13C6-PFDA) Surrogate	%	-	-	-	-	-
(13C7-PFUdA) Surrogate	%	-	-	-	-	-
(13C2-PFDoA) Surrogate	%	-	-	-	-	-
(13C2_PFTeDA) Surrogate	%	-	-	-	-	-
(13C2-PFHxDA) Surrogate	%	-	-	-	-	-
(13C3-PFBS) Surrogate	%	-	-	-	-	-
(13C3-PFHxS) Surrogate	%	-	-	-	-	-
(13C8-PFOS) Surrogate	%	-	-	-	-	-
(13C2-4:2 FTS) Surrogate	%	-	-	-	-	-
(13C2-6:2 FTS) Surrogate	%	-	-	-	-	-
(13C2-8:2 FTS) Surrogate	%	-	-	-	-	-
(13C8-PFOSA) Surrogate	%	-	-	-	-	-
(D3-N-MeFOSA) Surrogate	%	-	-	-	-	-
(D5-N-EtFOSA) Surrogate	%	-	-	-	-	-
(D7-N-MeFOSE) Surrogate	%	-	-	-	-	-
(D9-N-EtFOSE) Surrogate	%	-	-	-	-	-
(D3-N-MeFOSAA) Surrogate	%	-	-	-	-	-
(D5-N-EtFOSAA) Surrogate	%	-	-	-	-	-

Moisture Content Method: AN002 Tested: 2/5/2019

Parameter	Units	LOR	ME310282.009 Soil 17 Apr 2019 S11_0.4-0.5	ME310282.010 Soil 17 Apr 2019 S12_0-0.1	ME310282.011 Soil 17 Apr 2019 S14_0-0.1	ME310282.012 Soil 17 Apr 2019 S14_0.4-0.5
Sample Number / Sample Matrix / Sample Date / Sample Name						
Moisture Content Method: AN002 Tested: 2/5/2019 (continued)						
% Moisture*	%w/w	1	22.8	3.6	16.3	23.7

Per- and Polyfluoroalkyl Substances (PFAS) in Solid Samples- Low level Method: MA-1523 Tested: 1/5/2019

		Sample Number	ME310282.013	ME310282.014	ME310282.015	ME310282.016
		Sample Matrix	Soil	Soil	Soil	Soil
		Sample Date	17 Apr 2019	17 Apr 2019	17 Apr 2019	17 Apr 2019
		Sample Name	S15_0-0.1	S16_0-0.1	S18_0-0.1	S19_0-0.1
Parameter	**Units**	**LOR**				
Perfluorobutanoic acid (PFBA)	mg/kg	0.0001	**0.0003**	<0.0001	**0.0002**	**0.0002**
Perfluoropentanoic acid (PFPeA)	mg/kg	0.0005	<0.0005	<0.0005	<0.0005	<0.0005
Perfluorohexanoic acid (PFHxA)	mg/kg	0.0001	<0.0001	<0.0001	<0.0001	<0.0001
Perfluoroheptanoic acid (PFHpA)	mg/kg	0.0001	<0.0001	<0.0001	<0.0001	<0.0001
Perfluorooctanoic Acid (PFOA)	mg/kg	0.0001	<0.0001	<0.0001	<0.0001	<0.0001
Perfluorononanoic acid (PFNA)	mg/kg	0.0001	<0.0001	<0.0001	<0.0001	<0.0001
Perfluorodecanoic acid (PFDA)	mg/kg	0.0001	<0.0001	<0.0001	<0.0001	<0.0001
Perfluoroundecanoic acid (PFUnA)	mg/kg	0.0001	<0.0001	<0.0001	<0.0001	<0.0001
Perfluorododecanoic acid (PFDoA)	mg/kg	0.0001	<0.0001	<0.0001	<0.0001	<0.0001
Perfluorotridecanoic acid (PFTrDA)	mg/kg	0.0001	<0.0001	<0.0001	<0.0001	<0.0001
Perfluorotetradecanoic acid (PFTeDA)	mg/kg	0.0001	<0.0001	<0.0001	<0.0001	<0.0001
Perfluorohexadecanoic acid (PFHxDA)	mg/kg	0.0001	<0.0001	<0.0001	<0.0001	<0.0001
Perfluorobutane sulfonate (PFBS)	mg/kg	0.0001	<0.0001	<0.0001	<0.0001	<0.0001
Perfluoropentane sulfonate (PFPeS)	mg/kg	0.0001	<0.0001	<0.0001	<0.0001	<0.0001
Perfluorohexane sulfonate (PFHxS)	mg/kg	0.0001	<0.0001	<0.0001	<0.0001	<0.0001
Perfluoroheptane sulfonate (PFHpS)	mg/kg	0.0001	<0.0001	<0.0001	<0.0001	<0.0001
Perfluorooctane sulfonate (PFOS)	mg/kg	0.0001	**0.0002**	<0.0001	<0.0001	**0.0001**
Sum PFOS and PFHXS	mg/kg	0.0001	**0.0002**	<0.0001	<0.0001	**0.0001**
Perfluorononane sulfonate (PFNS)	mg/kg	0.0001	<0.0001	<0.0001	<0.0001	<0.0001
Perfluorodecane sulfonate (PFDS)	mg/kg	0.0001	<0.0001	<0.0001	<0.0001	<0.0001
Perfluorododecane sulfonate (PFDoS)	mg/kg	0.0001	<0.0001	<0.0001	<0.0001	<0.0001
1H,1H,2H,2H-Perfluorohexane sulfonate (4:2) (4:2 FTS)	mg/kg	0.001	<0.001	<0.001	<0.001	<0.001
1H,1H,2H,2H-Perfluorooctane sulfonate (6:2) (6:2 FTS)	mg/kg	0.001	<0.001	<0.001	<0.001	<0.001
1H,1H,2H,2H-Perfluorodecane sulfonate (8:2) (8:2 FTS)	mg/kg	0.001	<0.001	<0.001	<0.001	<0.001
Perfluoroctane sulfonamide (PFOSA)	mg/kg	0.001	<0.001	<0.001	<0.001	<0.001
N-Methylperfluoroctane sulfonamide (N-MeFOSA)	mg/kg	0.001	<0.001	<0.001	<0.001	<0.001
N-Ethylperfluoroctane sulfonamide (N-EtFOSA)	mg/kg	0.001	<0.001	<0.001	<0.001	<0.001
2-(N-Methylperfluorooctane sulfonamido)-ethanol (N-MeFOSE)	mg/kg	0.002	<0.002	<0.002	<0.002	<0.002
2-(N-Ethylperfluorooctane sulfonamido)-ethanol (N-EtFOSE)	mg/kg	0.002	<0.002	<0.002	<0.002	<0.002
N-Methylperfluorooctanesulfonamidoacetic acid (N_MeFOSAA)	mg/kg	0.001	<0.001	<0.001	<0.001	<0.001
N-Ethylperfluorooctanesulfonamidoacetic Acid (N-EtFOSAA)	mg/kg	0.001	<0.001	<0.001	<0.001	<0.001
(13C4-PFBA) Surrogate	%	-	**48**	**46**	**49**	**29**
(13C5_PFPeA) Surrogate	%	-	**65**	**62**	**65**	**34**
(13C5-PFHxA) Surrogate	%	-	**65**	**63**	**54**	**28**
(13C4-PFHpA) Surrogate	%	-	**77**	**52**	**48**	**43**
(13C4-PFOA) Surrogate	%	-	**65**	**53**	**36**	**28**
(13C9-PFNA) Surrogate	%	-	**60**	**55**	**50**	**26**
(13C6-PFDA) Surrogate	%	-	**59**	**46**	**43**	**34**
(13C7-PFUdA) Surrogate	%	-	**42**	**46**	**34**	**27**
(13C2-PFDoA) Surrogate	%	-	**38**	**38**	**30**	**21**
(13C2-PFTeDA) Surrogate	%	-	**27**	**33**	**28**	**20**
(13C2-PFHxDA) Surrogate	%	-	**25**	**31**	**26**	**17**
(13C3-PFBS) Surrogate	%	-	**45**	**47**	**45**	**32**
(13C3-PFHxS) Surrogate	%	-	**45**	**46**	**41**	**34**
(13C8-PFOS) Surrogate	%	-	**52**	**51**	**47**	**28**
(13C2-4:2FTS) Surrogate	%	-	**45**	**39**	**42**	**30**
(13C2-6:2FTS) Surrogate	%	-	**72**	**63**	**80**	**48**
(13C2-8:2FTS) Surrogate	%	-	**60**	**57**	**63**	**37**
(13C8-PFOSA) Surrogate	%	-	**32**	**31**	**28**	**20**
(D3-N-MeFOSA) Surrogate	%	-	**17**	**18**	**16**	**8**
(D5-N-EtFOSA) Surrogate	%	-	**18**	**17**	**17**	**6**
(D7-N-MeFOSE) Surrogate	%	-	**71**	**26**	**36**	**20**
(D9-N-EtFOSE) Surrogate	%	-	**29**	**35**	**32**	**25**
(D3-N-MeFOSAA) Surrogate	%	-	**42**	**43**	**41**	**28**
(D5-N-EtFOSAA) Surrogate	%	-	**40**	**50**	**41**	**32**

Per- and Polyfluoroalkyl Substances (PFAS) in Aqueous Samples Method: MA-1523 Tested: 3/5/2019

Parameter	Units	LOR	Sample Number Sample Matrix Sample Date Sample Name: ME310282.013 Soil 17 Apr 2019 S15_0-0.1	ME310282.014 Soil 17 Apr 2019 S16_0-0.1	ME310282.015 Soil 17 Apr 2019 S18_0-0.1	ME310282.016 Soil 17 Apr 2019 S19_0-0.1

Per- and Polyfluoroalkyl Substances (PFAS) in Aqueous Samples Method: MA-1523 Tested: 3/5/2019 (continued)

Perfluorobutanoic acid (PFBA)	µg/L	0.002	-	-	-	-
Perfluoropentanoic acid (PFPeA)	µg/L	0.002	-	-	-	-
Perfluorohexanoic acid (PFHxA)	µg/L	0.002	-	-	-	-
Perfluoroheptanoic acid (PFHpA)	µg/L	0.002	-	-	-	-
Perfluorooctanoic Acid (PFOA)	µg/L	0.001	-	-	-	-
Perfluorononanoic acid (PFNA)	µg/L	0.004	-	-	-	-
Perfluorodecanoic acid (PFDA)	µg/L	0.004	-	-	-	-
Perfluoroundecanoic acid (PFUnA)	µg/L	0.004	-	-	-	-
Perfluorododecanoic acid (PFDoA)	µg/L	0.004	-	-	-	-
Perfluorotridecanoic acid (PFTrDA)	µg/L	0.004	-	-	-	-
Perfluorotetradecanoic acid (PFTeDA)	µg/L	0.004	-	-	-	-
Perfluorohexadecanoic acid (PFHxDA)	µg/L	0.008	-	-	-	-
Perfluorobutane sulfonate (PFBS)	µg/L	0.004	-	-	-	-
Perfluoropentane sulfonate (PFPeS)	µg/L	0.004	-	-	-	-
Perfluorohexane sulfonate (PFHxS)	µg/L	0.002	-	-	-	-
Perfluoroheptane sulfonate (PFHpS)	µg/L	0.002	-	-	-	-
Perfluorooctane sulfonate (PFOS)	µg/L	0.002	-	-	-	-
Sum of PFHxS and PFOS	µg/L	0.002	-	-	-	-
Perfluorononane sulfonate (PFNS)	µg/L	0.002	-	-	-	-
Perfluorodecane sulfonate (PFDS)	µg/L	0.002	-	-	-	-
Perfluorododecane sulfonate (PFDoS)	µg/L	0.002	-	-	-	-
1H,1H,2H,2H-Perfluorohexane sulfonate (4:2) (4:2 FTS)	µg/L	0.002	-	-	-	-
1H,1H,2H,2H-Perfluorooctane sulfonate (6:2) (6:2 FTS)	µg/L	0.002	-	-	-	-
1H,1H,2H,2H-Perfluorodecane sulfonate (8:2) (8:2 FTS)	µg/L	0.002	-	-	-	-
Perfluoroctane sulfonamide (PFOSA)	µg/L	0.008	-	-	-	-
N-Methylperfluoroctane sulfonamide (N-MeFOSA)	µg/L	0.01	-	-	-	-
N-Ethylperfluoroctane sulfonamide (N-EtFOSA)	µg/L	0.01	-	-	-	-
2-(N-Methylperfluorooctane sulfonamido)-ethanol (N-MeFOSE)	µg/L	0.01	-	-	-	-
2-(N-Ethylperfluorooctane sulfonamido)-ethanol (N-EtFOSE)	µg/L	0.01	-	-	-	-
N-Methylperfluorooctanesulfonamidoacetic acid (N_MeFOSAA)	µg/L	0.01	-	-	-	-
N-Ethylperfluorooctanesulfonamidoacetic Acid (N-EtFOSAA)	µg/L	0.01	-	-	-	-
(13C4-PFBA) Surrogate	%	-	-	-	-	-
(13C5-PFPeA) Surrogate	%	-	-	-	-	-
(13C5-PFHxA) Surrogate	%	-	-	-	-	-
(13C4-PFHpA) Surrogate	%	-	-	-	-	-
(13C4_PFOA) Surrogate	%	-	-	-	-	-
(13C9-PFNA) Surrogate	%	-	-	-	-	-
(13C6-PFDA) Surrogate	%	-	-	-	-	-
(13C7-PFUdA) Surrogate	%	-	-	-	-	-
(13C2-PFDoA) Surrogate	%	-	-	-	-	-
(13C2_PFTeDA) Surrogate	%	-	-	-	-	-
(13C2-PFHxDA) Surrogate	%	-	-	-	-	-
(13C3-PFBS) Surrogate	%	-	-	-	-	-
(13C3-PFHxS) Surrogate	%	-	-	-	-	-
(13C8-PFOS) Surrogate	%	-	-	-	-	-
(13C2-4:2 FTS) Surrogate	%	-	-	-	-	-
(13C2-6:2 FTS) Surrogate	%	-	-	-	-	-
(13C2-8:2 FTS) Surrogate	%	-	-	-	-	-
(13C8-PFOSA) Surrogate	%	-	-	-	-	-
(D3-N-MeFOSA) Surrogate	%	-	-	-	-	-
(D5-N-EtFOSA) Surrogate	%	-	-	-	-	-
(D7-N-MeFOSE) Surrogate	%	-	-	-	-	-
(D9-N-EtFOSE) Surrogate	%	-	-	-	-	-
(D3-N-MeFOSAA) Surrogate	%	-	-	-	-	-
(D5-N-EtFOSAA) Surrogate	%	-	-	-	-	-

Moisture Content Method: AN002 Tested: 2/5/2019

Parameter	Units	LOR	ME310282.013 Soil 17 Apr 2019 S15_0-0.1	ME310282.014 Soil 17 Apr 2019 S16_0-0.1	ME310282.015 Soil 17 Apr 2019 S18_0-0.1	ME310282.016 Soil 17 Apr 2019 S19_0-0.1
Sample Number / Sample Matrix / Sample Date / Sample Name						
Moisture Content Method: AN002 Tested: 2/5/2019 (continued)						
% Moisture*	%w/w	1	13.4	3.1	10.1	8.7

		Sample Number	ME310282.017	ME310282.018	ME310282.019	ME310282.020
		Sample Matrix	Soil	Soil	Soil	Soil
		Sample Date	17 Apr 2019	17 Apr 2019	17 Apr 2019	17 Apr 2019
		Sample Name	S19_0.4-0.5	S20_0-0.1	S20_0.4-0.5	S23_0-0.1
Parameter	Units	LOR				

Per- and Polyfluoroalkyl Substances (PFAS) in Solid Samples- Low level Method: MA-1523 Tested: 1/5/2019

Perfluorobutanoic acid (PFBA)	mg/kg	0.0001	<0.0001	<0.0001	<0.0001	<0.0001
Perfluoropentanoic acid (PFPeA)	mg/kg	0.0005	<0.0005	<0.0005	<0.0005	<0.0005
Perfluorohexanoic acid (PFHxA)	mg/kg	0.0001	<0.0001	<0.0001	<0.0001	<0.0001
Perfluoroheptanoic acid (PFHpA)	mg/kg	0.0001	<0.0001	<0.0001	<0.0001	<0.0001
Perfluorooctanoic Acid (PFOA)	mg/kg	0.0001	<0.0001	<0.0001	<0.0001	<0.0001
Perfluorononanoic acid (PFNA)	mg/kg	0.0001	<0.0001	<0.0001	<0.0001	<0.0001
Perfluorodecanoic acid (PFDA)	mg/kg	0.0001	<0.0001	<0.0001	<0.0001	<0.0001
Perfluoroundecanoic acid (PFUnA)	mg/kg	0.0001	<0.0001	<0.0001	<0.0001	<0.0001
Perfluorododecanoic acid (PFDoA)	mg/kg	0.0001	<0.0001	<0.0001	<0.0001	<0.0001
Perfluorotridecanoic acid (PFTrDA)	mg/kg	0.0001	<0.0001	<0.0001	<0.0001	<0.0001
Perfluorotetradecanoic acid (PFTeDA)	mg/kg	0.0001	<0.0001	<0.0001	<0.0001	<0.0001
Perfluorohexadecanoic acid (PFHxDA)	mg/kg	0.0001	<0.0001	<0.0001	<0.0001	<0.0001
Perfluorobutane sulfonate (PFBS)	mg/kg	0.0001	<0.0001	<0.0001	<0.0001	<0.0001
Perfluoropentane sulfonate (PFPeS)	mg/kg	0.0001	<0.0001	<0.0001	<0.0001	<0.0001
Perfluorohexane sulfonate (PFHxS)	mg/kg	0.0001	<0.0001	<0.0001	<0.0001	<0.0001
Perfluoroheptane sulfonate (PFHpS)	mg/kg	0.0001	<0.0001	<0.0001	<0.0001	<0.0001
Perfluorooctane sulfonate (PFOS)	mg/kg	0.0001	<0.0001	**0.0001**	<0.0001	**0.0001**
Sum PFOS and PFHXS	mg/kg	0.0001	<0.0001	**0.0001**	<0.0001	**0.0001**
Perfluorononane sulfonate (PFNS)	mg/kg	0.0001	<0.0001	<0.0001	<0.0001	<0.0001
Perfluorodecane sulfonate (PFDS)	mg/kg	0.0001	<0.0001	<0.0001	<0.0001	<0.0001
Perfluorododecane sulfonate (PFDoS)	mg/kg	0.0001	<0.0001	<0.0001	<0.0001	<0.0001
1H,1H,2H,2H-Perfluorohexane sulfonate (4:2) (4:2 FTS)	mg/kg	0.001	<0.001	<0.001	<0.001	<0.001
1H,1H,2H,2H-Perfluorooctane sulfonate (6:2) (6:2 FTS)	mg/kg	0.001	<0.001	<0.001	<0.001	<0.001
1H,1H,2H,2H-Perfluorodecane sulfonate (8:2) (8:2 FTS)	mg/kg	0.001	<0.001	<0.001	<0.001	<0.001
Perfluoroctane sulfonamide (PFOSA)	mg/kg	0.001	<0.001	<0.001	<0.001	<0.001
N-Methylperfluoroctane sulfonamide (N-MeFOSA)	mg/kg	0.001	<0.001	<0.001	<0.001	<0.001
N-Ethylperfluoroctane sulfonamide (N-EtFOSA)	mg/kg	0.001	<0.001	<0.001	<0.001	<0.001
2-(N-Methylperfluorooctane sulfonamido)-ethanol (N-MeFOSE)	mg/kg	0.002	<0.002	<0.002	<0.002	<0.002
2-(N-Ethylperfluorooctane sulfonamido)-ethanol (N-EtFOSE)	mg/kg	0.002	<0.002	<0.002	<0.002	<0.002
N-Methylperfluorooctanesulfonamidoacetic acid (N_MeFOSAA)	mg/kg	0.001	<0.001	<0.001	<0.001	<0.001
N-Ethylperfluorooctanesulfonamidoacetic Acid (N-EtFOSAA)	mg/kg	0.001	<0.001	<0.001	<0.001	<0.001
(13C4-PFBA) Surrogate	%	-	54	53	35	53
(13C5_PFPeA) Surrogate	%	-	80	67	17	69
(13C5-PFHxA) Surrogate	%	-	71	56	37	73
(13C4-PFHpA) Surrogate	%	-	62	68	37	86
(13C4-PFOA) Surrogate	%	-	61	51	38	54
(13C9-PFNA) Surrogate	%	-	60	61	33	55
(13C6-PFDA) Surrogate	%	-	53	42	38	59
(13C7-PFUdA) Surrogate	%	-	44	51	28	12
(13C2-PFDoA) Surrogate	%	-	35	40	28	22
(13C2-PFTeDA) Surrogate	%	-	32	33	24	25
(13C2-PFHxDA) Surrogate	%	-	31	29	25	34
(13C3-PFBS) Surrogate	%	-	55	50	40	56
(13C3-PFHxS) Surrogate	%	-	53	52	42	56
(13C8-PFOS) Surrogate	%	-	60	46	29	50
(13C2-4:2FTS) Surrogate	%	-	52	42	43	46
(13C2-6:2FTS) Surrogate	%	-	63	68	40	75
(13C2-8:2FTS) Surrogate	%	-	56	54	38	40
(13C8-PFOSA) Surrogate	%	-	42	33	24	10
(D3-N-MeFOSA) Surrogate	%	-	18	17	14	11
(D5-N-EtFOSA) Surrogate	%	-	16	16	14	0
(D7-N-MeFOSE) Surrogate	%	-	53	26	19	157
(D9-N-EtFOSE) Surrogate	%	-	26	29	19	54
(D3-N-MeFOSAA) Surrogate	%	-	50	44	32	23
(D5-N-EtFOSAA) Surrogate	%	-	56	55	39	5

Per- and Polyfluoroalkyl Substances (PFAS) in Aqueous Samples Method: MA-1523 Tested: 3/5/2019

		Sample Number	ME310282.017	ME310282.018	ME310282.019	ME310282.020
		Sample Matrix	Soil	Soil	Soil	Soil
		Sample Date	17 Apr 2019	17 Apr 2019	17 Apr 2019	17 Apr 2019
		Sample Name	S19_0.4-0.5	S20_0-0.1	S20_0.4-0.5	S23_0-0.1
Parameter	**Units**	**LOR**				
Per- and Polyfluoroalkyl Substances (PFAS) in Aqueous Samples	**Method: MA-1523**	**Tested: 3/5/2019**	**(continued)**			
Perfluorobutanoic acid (PFBA)	µg/L	0.002	-	-	-	-
Perfluoropentanoic acid (PFPeA)	µg/L	0.002	-	-	-	-
Perfluorohexanoic acid (PFHxA)	µg/L	0.002	-	-	-	-
Perfluoroheptanoic acid (PFHpA)	µg/L	0.002	-	-	-	-
Perfluorooctanoic Acid (PFOA)	µg/L	0.001	-	-	-	-
Perfluorononanoic acid (PFNA)	µg/L	0.004	-	-	-	-
Perfluorodecanoic acid (PFDA)	µg/L	0.004	-	-	-	-
Perfluoroundecanoic acid (PFUnA)	µg/L	0.004	-	-	-	-
Perfluorododecanoic acid (PFDoA)	µg/L	0.004	-	-	-	-
Perfluorotridecanoic acid (PFTrDA)	µg/L	0.004	-	-	-	-
Perfluorotetradecanoic acid (PFTeDA)	µg/L	0.004	-	-	-	-
Perfluorohexadecanoic acid (PFHxDA)	µg/L	0.008	-	-	-	-
Perfluorobutane sulfonate (PFBS)	µg/L	0.004	-	-	-	-
Perfluoropentane sulfonate (PFPeS)	µg/L	0.004	-	-	-	-
Perfluorohexane sulfonate (PFHxS)	µg/L	0.002	-	-	-	-
Perfluoroheptane sulfonate (PFHpS)	µg/L	0.002	-	-	-	-
Perfluorooctane sulfonate (PFOS)	µg/L	0.002	-	-	-	-
Sum of PFHxS and PFOS	µg/L	0.002	-	-	-	-
Perfluorononane sulfonate (PFNS)	µg/L	0.002	-	-	-	-
Perfluorodecane sulfonate (PFDS)	µg/L	0.002	-	-	-	-
Perfluorododecane sulfonate (PFDoS)	µg/L	0.002	-	-	-	-
1H,1H,2H,2H-Perfluorohexane sulfonate (4:2) (4:2 FTS)	µg/L	0.002	-	-	-	-
1H,1H,2H,2H-Perfluorooctane sulfonate (6:2) (6:2 FTS)	µg/L	0.002	-	-	-	-
1H,1H,2H,2H-Perfluorodecane sulfonate (8:2) (8:2 FTS)	µg/L	0.002	-	-	-	-
Perfluoroctane sulfonamide (PFOSA)	µg/L	0.008	-	-	-	-
N-Methylperfluoroctane sulfonamide (N-MeFOSA)	µg/L	0.01	-	-	-	-
N-Ethylperfluoroctane sulfonamide (N-EtFOSA)	µg/L	0.01	-	-	-	-
2-(N-Methylperfluorooctane sulfonamido)-ethanol (N-MeFOSE)	µg/L	0.01	-	-	-	-
2-(N-Ethylperfluorooctane sulfonamido)-ethanol (N-EtFOSE)	µg/L	0.01	-	-	-	-
N-Methylperfluorooctanesulfonamidoacetic acid (N_MeFOSAA)	µg/L	0.01	-	-	-	-
N-Ethylperfluorooctanesulfonamidoacetic Acid (N-EtFOSAA)	µg/L	0.01	-	-	-	-
(13C4-PFBA) Surrogate	%	-	-	-	-	-
(13C5-PFPeA) Surrogate	%	-	-	-	-	-
(13C5-PFHxA) Surrogate	%	-	-	-	-	-
(13C4-PFHpA) Surrogate	%	-	-	-	-	-
(13C4_PFOA) Surrogate	%	-	-	-	-	-
(13C9-PFNA) Surrogate	%	-	-	-	-	-
(13C6-PFDA) Surrogate	%	-	-	-	-	-
(13C7-PFUdA) Surrogate	%	-	-	-	-	-
(13C2-PFDoA) Surrogate	%	-	-	-	-	-
(13C2_PFTeDA) Surrogate	%	-	-	-	-	-
(13C2-PFHxDA) Surrogate	%	-	-	-	-	-
(13C3-PFBS) Surrogate	%	-	-	-	-	-
(13C3-PFHxS) Surrogate	%	-	-	-	-	-
(13C8-PFOS) Surrogate	%	-	-	-	-	-
(13C2-4:2 FTS) Surrogate	%	-	-	-	-	-
(13C2-6:2 FTS) Surrogate	%	-	-	-	-	-
(13C2-8:2 FTS) Surrogate	%	-	-	-	-	-
(13C8-PFOSA) Surrogate	%	-	-	-	-	-
(D3-N-MeFOSA) Surrogate	%	-	-	-	-	-
(D5-N-EtFOSA) Surrogate	%	-	-	-	-	-
(D7-N-MeFOSE) Surrogate	%	-	-	-	-	-
(D9-N-EtFOSE) Surrogate	%	-	-	-	-	-
(D3-N-MeFOSAA) Surrogate	%	-	-	-	-	-
(D5-N-EtFOSAA) Surrogate	%	-	-	-	-	-

Moisture Content Method: AN002 Tested: 2/5/2019

Parameter	Units	LOR	ME310282.017 Soil 17 Apr 2019 S19_0.4-0.5	ME310282.018 Soil 17 Apr 2019 S20_0-0.1	ME310282.019 Soil 17 Apr 2019 S20_0.4-0.5	ME310282.020 Soil 17 Apr 2019 S23_0-0.1
Moisture Content Method: AN002 Tested: 2/5/2019 (continued)						
% Moisture*	%w/w	1	23.6	5.9	10.0	2.9

Row labels of the header block: Sample Number, Sample Matrix, Sample Date, Sample Name

		Sample Number	ME310282.021	ME310282.022	ME310282.023	ME310282.024
		Sample Matrix	Soil	Soil	Soil	Soil
		Sample Date	17 Apr 2019	17 Apr 2019	17 Apr 2019	17 Apr 2019
		Sample Name	S24_0-0.1	S25_0-0.2	S26_0-0.2	QC01
Parameter	**Units**	**LOR**				
Per- and Polyfluoroalkyl Substances (PFAS) in Solid Samples- Low level Method: MA-1523 Tested: 1/5/2019						
Perfluorobutanoic acid (PFBA)	mg/kg	0.0001	<0.0001	<0.0001	<0.0001	<0.0001
Perfluoropentanoic acid (PFPeA)	mg/kg	0.0005	<0.0005	<0.0005	<0.0005	<0.0005
Perfluorohexanoic acid (PFHxA)	mg/kg	0.0001	<0.0001	<0.0001	<0.0001	<0.0001
Perfluoroheptanoic acid (PFHpA)	mg/kg	0.0001	<0.0001	<0.0001	<0.0001	<0.0001
Perfluorooctanoic Acid (PFOA)	mg/kg	0.0001	<0.0001	<0.0001	<0.0001	**0.0002**
Perfluorononanoic acid (PFNA)	mg/kg	0.0001	<0.0001	<0.0001	<0.0001	<0.0001
Perfluorodecanoic acid (PFDA)	mg/kg	0.0001	<0.0001	<0.0001	<0.0001	<0.0001
Perfluoroundecanoic acid (PFUnA)	mg/kg	0.0001	<0.0001	<0.0001	<0.0001	<0.0001
Perfluorododecanoic acid (PFDoA)	mg/kg	0.0001	<0.0001	<0.0001	<0.0001	<0.0001
Perfluorotridecanoic acid (PFTrDA)	mg/kg	0.0001	<0.0001	<0.0001	<0.0001	<0.0001
Perfluorotetradecanoic acid (PFTeDA)	mg/kg	0.0001	<0.0001	<0.0001	<0.0001	<0.0001
Perfluorohexadecanoic acid (PFHxDA)	mg/kg	0.0001	<0.0001	<0.0001	<0.0001	<0.0001
Perfluorobutane sulfonate (PFBS)	mg/kg	0.0001	<0.0001	<0.0001	<0.0001	<0.0001
Perfluoropentane sulfonate (PFPeS)	mg/kg	0.0001	<0.0001	<0.0001	<0.0001	<0.0001
Perfluorohexane sulfonate (PFHxS)	mg/kg	0.0001	<0.0001	<0.0001	<0.0001	**0.0002**
Perfluoroheptane sulfonate (PFHpS)	mg/kg	0.0001	<0.0001	<0.0001	<0.0001	<0.0001
Perfluorooctane sulfonate (PFOS)	mg/kg	0.0001	<0.0001	<0.0001	<0.0001	**0.0072**
Sum PFOS and PFHXS	mg/kg	0.0001	<0.0001	<0.0001	<0.0001	**0.0074**
Perfluorononane sulfonate (PFNS)	mg/kg	0.0001	<0.0001	<0.0001	<0.0001	<0.0001
Perfluorodecane sulfonate (PFDS)	mg/kg	0.0001	<0.0001	<0.0001	<0.0001	<0.0001
Perfluorododecane sulfonate (PFDoS)	mg/kg	0.0001	<0.0001	<0.0001	<0.0001	<0.0001
1H,1H,2H,2H-Perfluorohexane sulfonate (4:2) (4:2 FTS)	mg/kg	0.001	<0.001	<0.001	<0.001	<0.001
1H,1H,2H,2H-Perfluorooctane sulfonate (6:2) (6:2 FTS)	mg/kg	0.001	<0.001	<0.001	<0.001	<0.001
1H,1H,2H,2H-Perfluorodecane sulfonate (8:2) (8:2 FTS)	mg/kg	0.001	<0.001	<0.001	<0.001	<0.001
Perfluoroctane sulfonamide (PFOSA)	mg/kg	0.001	<0.001	<0.001	<0.001	<0.001
N-Methylperfluoroctane sulfonamide (N-MeFOSA)	mg/kg	0.001	<0.001	<0.001	<0.001	<0.001
N-Ethylperfluoroctane sulfonamide (N-EtFOSA)	mg/kg	0.001	<0.001	<0.001	<0.001	<0.001
2-(N-Methylperfluorooctane sulfonamido)-ethanol (N-MeFOSE)	mg/kg	0.002	<0.002	<0.002	<0.002	<0.002
2-(N-Ethylperfluorooctane sulfonamido)-ethanol (N-EtFOSE)	mg/kg	0.002	<0.002	<0.002	<0.002	<0.002
N-Methylperfluorooctanesulfonamidoacetic acid (N_MeFOSAA)	mg/kg	0.001	<0.001	<0.001	<0.001	<0.001
N-Ethylperfluorooctanesulfonamidoacetic Acid (N-EtFOSAA)	mg/kg	0.001	<0.001	<0.001	<0.001	<0.001
(13C4-PFBA) Surrogate	%	-	54	57	46	57
(13C5_PFPeA) Surrogate	%	-	66	70	53	72
(13C5-PFHxA) Surrogate	%	-	70	69	53	82
(13C4-PFHpA) Surrogate	%	-	67	87	74	92
(13C4-PFOA) Surrogate	%	-	49	64	49	57
(13C9-PFNA) Surrogate	%	-	56	69	41	67
(13C6-PFDA) Surrogate	%	-	50	59	57	61
(13C7-PFUdA) Surrogate	%	-	16	48	51	48
(13C2-PFDoA) Surrogate	%	-	22	39	37	40
(13C2-PFTeDA) Surrogate	%	-	24	32	31	32
(13C2-PFHxDA) Surrogate	%	-	28	38	19	24
(13C3-PFBS) Surrogate	%	-	53	54	46	69
(13C3-PFHxS) Surrogate	%	-	49	56	45	59
(13C8-PFOS) Surrogate	%	-	44	59	55	58
(13C2-4:2FTS) Surrogate	%	-	37	51	19	60
(13C2-6:2FTS) Surrogate	%	-	54	99	68	118
(13C2-8:2FTS) Surrogate	%	-	34	100	40	94
(13C8-PFOSA) Surrogate	%	-	11	32	26	22
(D3-N-MeFOSA) Surrogate	%	-	14	19	15	12
(D5-N-EtFOSA) Surrogate	%	-	3	12	10	9
(D7-N-MeFOSE) Surrogate	%	-	79	37	37	35
(D9-N-EtFOSE) Surrogate	%	-	1	12	20	22
(D3-N-MeFOSAA) Surrogate	%	-	23	62	29	36
(D5-N-EtFOSAA) Surrogate	%	-	6	37	26	35

Per- and Polyfluoroalkyl Substances (PFAS) in Aqueous Samples Method: MA-1523 Tested: 3/5/2019

Parameter	Units	LOR	Sample Number Sample Matrix Sample Date Sample Name: ME310282.021 Soil 17 Apr 2019 S24_0-0.1	ME310282.022 Soil 17 Apr 2019 S25_0-0.2	ME310282.023 Soil 17 Apr 2019 S26_0-0.2	ME310282.024 Soil 17 Apr 2019 QC01
Per- and Polyfluoroalkyl Substances (PFAS) in Aqueous Samples Method: MA-1523 Tested: 3/5/2019 (continued)						
Perfluorobutanoic acid (PFBA)	µg/L	0.002	-	-	-	-
Perfluoropentanoic acid (PFPeA)	µg/L	0.002	-	-	-	-
Perfluorohexanoic acid (PFHxA)	µg/L	0.002	-	-	-	-
Perfluoroheptanoic acid (PFHpA)	µg/L	0.002	-	-	-	-
Perfluorooctanoic Acid (PFOA)	µg/L	0.001	-	-	-	-
Perfluorononanoic acid (PFNA)	µg/L	0.004	-	-	-	-
Perfluorodecanoic acid (PFDA)	µg/L	0.004	-	-	-	-
Perfluoroundecanoic acid (PFUnA)	µg/L	0.004	-	-	-	-
Perfluorododecanoic acid (PFDoA)	µg/L	0.004	-	-	-	-
Perfluorotridecanoic acid (PFTrDA)	µg/L	0.004	-	-	-	-
Perfluorotetradecanoic acid (PFTeDA)	µg/L	0.004	-	-	-	-
Perfluorohexadecanoic acid (PFHxDA)	µg/L	0.008	-	-	-	-
Perfluorobutane sulfonate (PFBS)	µg/L	0.004	-	-	-	-
Perfluoropentane sulfonate (PFPeS)	µg/L	0.004	-	-	-	-
Perfluorohexane sulfonate (PFHxS)	µg/L	0.002	-	-	-	-
Perfluoroheptane sulfonate (PFHpS)	µg/L	0.002	-	-	-	-
Perfluorooctane sulfonate (PFOS)	µg/L	0.002	-	-	-	-
Sum of PFHxS and PFOS	µg/L	0.002	-	-	-	-
Perfluorononane sulfonate (PFNS)	µg/L	0.002	-	-	-	-
Perfluorodecane sulfonate (PFDS)	µg/L	0.002	-	-	-	-
Perfluorododecane sulfonate (PFDoS)	µg/L	0.002	-	-	-	-
1H,1H,2H,2H-Perfluorohexane sulfonate (4:2) (4:2 FTS)	µg/L	0.002	-	-	-	-
1H,1H,2H,2H-Perfluorooctane sulfonate (6:2) (6:2 FTS)	µg/L	0.002	-	-	-	-
1H,1H,2H,2H-Perfluorodecane sulfonate (8:2) (8:2 FTS)	µg/L	0.002	-	-	-	-
Perfluoroctane sulfonamide (PFOSA)	µg/L	0.008	-	-	-	-
N-Methylperfluoroctane sulfonamide (N-MeFOSA)	µg/L	0.01	-	-	-	-
N-Ethylperfluoroctane sulfonamide (N-EtFOSA)	µg/L	0.01	-	-	-	-
2-(N-Methylperfluorooctane sulfonamido)-ethanol (N-MeFOSE)	µg/L	0.01	-	-	-	-
2-(N-Ethylperfluorooctane sulfonamido)-ethanol (N-EtFOSE)	µg/L	0.01	-	-	-	-
N-Methylperfluorooctanesulfonamidoacetic acid (N_MeFOSAA)	µg/L	0.01	-	-	-	-
N-Ethylperfluorooctanesulfonamidoacetic Acid (N-EtFOSAA)	µg/L	0.01	-	-	-	-
(13C4-PFBA) Surrogate	%	-	-	-	-	-
(13C5-PFPeA) Surrogate	%	-	-	-	-	-
(13C5-PFHxA) Surrogate	%	-	-	-	-	-
(13C4-PFHpA) Surrogate	%	-	-	-	-	-
(13C4_PFOA) Surrogate	%	-	-	-	-	-
(13C9-PFNA) Surrogate	%	-	-	-	-	-
(13C6-PFDA) Surrogate	%	-	-	-	-	-
(13C7-PFUdA) Surrogate	%	-	-	-	-	-
(13C2-PFDoA) Surrogate	%	-	-	-	-	-
(13C2_PFTeDA) Surrogate	%	-	-	-	-	-
(13C2-PFHxDA) Surrogate	%	-	-	-	-	-
(13C3-PFBS) Surrogate	%	-	-	-	-	-
(13C3-PFHxS) Surrogate	%	-	-	-	-	-
(13C8-PFOS) Surrogate	%	-	-	-	-	-
(13C2-4:2 FTS) Surrogate	%	-	-	-	-	-
(13C2-6:2 FTS) Surrogate	%	-	-	-	-	-
(13C2-8:2 FTS) Surrogate	%	-	-	-	-	-
(13C8-PFOSA) Surrogate	%	-	-	-	-	-
(D3-N-MeFOSA) Surrogate	%	-	-	-	-	-
(D5-N-EtFOSA) Surrogate	%	-	-	-	-	-
(D7-N-MeFOSE) Surrogate	%	-	-	-	-	-
(D9-N-EtFOSE) Surrogate	%	-	-	-	-	-
(D3-N-MeFOSAA) Surrogate	%	-	-	-	-	-
(D5-N-EtFOSAA) Surrogate	%	-	-	-	-	-

Moisture Content Method: AN002 Tested: 2/5/2019

Parameter	Units	LOR	ME310282.021	ME310282.022	ME310282.023	ME310282.024
Sample Matrix			Soil	Soil	Soil	Soil
Sample Date			17 Apr 2019	17 Apr 2019	17 Apr 2019	17 Apr 2019
Sample Name			S24_0-0.1	S25_0-0.2	S26_0-0.2	QC01
Moisture Content Method: AN002 Tested: 2/5/2019 (continued)						
% Moisture*	%w/w	1	5.5	6.6	5.2	28.3

		Sample Number	ME310282.025	ME310282.026
		Sample Matrix	Soil	Water
		Sample Date	17 Apr 2019	17 Apr 2019
		Sample Name	QC03	Rinsate_170419
Parameter	Units	LOR		

Per- and Polyfluoroalkyl Substances (PFAS) in Solid Samples- Low level Method: MA-1523 Tested: 1/5/2019

Perfluorobutanoic acid (PFBA)	mg/kg	0.0001	**0.0002**	-
Perfluoropentanoic acid (PFPeA)	mg/kg	0.0005	<0.0005	-
Perfluorohexanoic acid (PFHxA)	mg/kg	0.0001	<0.0001	-
Perfluoroheptanoic acid (PFHpA)	mg/kg	0.0001	<0.0001	-
Perfluorooctanoic Acid (PFOA)	mg/kg	0.0001	<0.0001	-
Perfluorononanoic acid (PFNA)	mg/kg	0.0001	<0.0001	-
Perfluorodecanoic acid (PFDA)	mg/kg	0.0001	<0.0001	-
Perfluoroundecanoic acid (PFUnA)	mg/kg	0.0001	<0.0001	-
Perfluorododecanoic acid (PFDoA)	mg/kg	0.0001	<0.0001	-
Perfluorotridecanoic acid (PFTrDA)	mg/kg	0.0001	<0.0001	-
Perfluorotetradecanoic acid (PFTeDA)	mg/kg	0.0001	<0.0001	-
Perfluorohexadecanoic acid (PFHxDA)	mg/kg	0.0001	<0.0001	-
Perfluorobutane sulfonate (PFBS)	mg/kg	0.0001	<0.0001	-
Perfluoropentane sulfonate (PFPeS)	mg/kg	0.0001	<0.0001	-
Perfluorohexane sulfonate (PFHxS)	mg/kg	0.0001	<0.0001	-
Perfluoroheptane sulfonate (PFHpS)	mg/kg	0.0001	<0.0001	-
Perfluorooctane sulfonate (PFOS)	mg/kg	0.0001	**0.0001**	-
Sum PFOS and PFHXS	mg/kg	0.0001	**0.0001**	-
Perfluorononane sulfonate (PFNS)	mg/kg	0.0001	<0.0001	-
Perfluorodecane sulfonate (PFDS)	mg/kg	0.0001	<0.0001	-
Perfluorododecane sulfonate (PFDoS)	mg/kg	0.0001	<0.0001	-
1H,1H,2H,2H-Perfluorohexane sulfonate (4:2) (4:2 FTS)	mg/kg	0.001	<0.001	-
1H,1H,2H,2H-Perfluorooctane sulfonate (6:2) (6:2 FTS)	mg/kg	0.001	<0.001	-
1H,1H,2H,2H-Perfluorodecane sulfonate (8:2) (8:2 FTS)	mg/kg	0.001	<0.001	-
Perfluoroctane sulfonamide (PFOSA)	mg/kg	0.001	<0.001	-
N-Methylperfluoroctane sulfonamide (N-MeFOSA)	mg/kg	0.001	<0.001	-
N-Ethylperfluoroctane sulfonamide (N-EtFOSA)	mg/kg	0.001	<0.001	-
2-(N-Methylperfluorooctane sulfonamido)-ethanol (N-MeFOSE)	mg/kg	0.002	<0.002	-
2-(N-Ethylperfluorooctane sulfonamido)-ethanol (N-EtFOSE)	mg/kg	0.002	<0.002	-
N-Methylperfluorooctanesulfonamidoacetic acid (N_MeFOSAA)	mg/kg	0.001	<0.001	-
N-Ethylperfluorooctanesulfonamidoacetic Acid (N-EtFOSAA)	mg/kg	0.001	<0.001	-
(13C4-PFBA) Surrogate	%	-	**54**	-
(13C5_PFPeA) Surrogate	%	-	**66**	-
(13C5-PFHxA) Surrogate	%	-	**55**	-
(13C4-PFHpA) Surrogate	%	-	**58**	-
(13C4-PFOA) Surrogate	%	-	**49**	-
(13C9-PFNA) Surrogate	%	-	**52**	-
(13C6-PFDA) Surrogate	%	-	**48**	-
(13C7-PFUdA) Surrogate	%	-	**41**	-
(13C2-PFDoA) Surrogate	%	-	**36**	-
(13C2-PFTeDA) Surrogate	%	-	**29**	-
(13C2-PFHxDA) Surrogate	%	-	**23**	-
(13C3-PFBS) Surrogate	%	-	**51**	-
(13C3-PFHxS) Surrogate	%	-	**49**	-
(13C8-PFOS) Surrogate	%	-	**47**	-
(13C2-4:2FTS) Surrogate	%	-	**54**	-
(13C2-6:2FTS) Surrogate	%	-	**88**	-
(13C2-8:2FTS) Surrogate	%	-	**76**	-
(13C8-PFOSA) Surrogate	%	-	**29**	-
(D3-N-MeFOSA) Surrogate	%	-	**16**	-
(D5-N-EtFOSA) Surrogate	%	-	**15**	-
(D7-N-MeFOSE) Surrogate	%	-	**92**	-
(D9-N-EtFOSE) Surrogate	%	-	**13**	-
(D3-N-MeFOSAA) Surrogate	%	-	**42**	-
(D5-N-EtFOSAA) Surrogate	%	-	**35**	-

Per- and Polyfluoroalkyl Substances (PFAS) in Aqueous Samples Method: MA-1523 Tested: 3/5/2019

			Sample Number	ME310282.025	ME310282.026
			Sample Matrix	Soil	Water
			Sample Date	17 Apr 2019	17 Apr 2019
			Sample Name	QC03	Rinsate_170419
Parameter	Units	LOR			

Per- and Polyfluoroalkyl Substances (PFAS) in Aqueous Samples Method: MA-1523 Tested: 2/5/2019 (continued)

Parameter	Units	LOR	ME310282.025	ME310282.026
Perfluorobutanoic acid (PFBA)	µg/L	0.002	-	<0.002
Perfluoropentanoic acid (PFPeA)	µg/L	0.002	-	<0.002
Perfluorohexanoic acid (PFHxA)	µg/L	0.002	-	<0.002
Perfluoroheptanoic acid (PFHpA)	µg/L	0.002	-	<0.002
Perfluorooctanoic Acid (PFOA)	µg/L	0.001	-	<0.001
Perfluorononanoic acid (PFNA)	µg/L	0.004	-	<0.004
Perfluorodecanoic acid (PFDA)	µg/L	0.004	-	<0.004
Perfluoroundecanoic acid (PFUnA)	µg/L	0.004	-	<0.004
Perfluorododecanoic acid (PFDoA)	µg/L	0.004	-	<0.004
Perfluorotridecanoic acid (PFTrDA)	µg/L	0.004	-	<0.004
Perfluorotetradecanoic acid (PFTeDA)	µg/L	0.004	-	<0.004
Perfluorohexadecanoic acid (PFHxDA)	µg/L	0.008	-	<0.008
Perfluorobutane sulfonate (PFBS)	µg/L	0.004	-	<0.004
Perfluoropentane sulfonate (PFPeS)	µg/L	0.004	-	<0.004
Perfluorohexane sulfonate (PFHxS)	µg/L	0.002	-	<0.002
Perfluoroheptane sulfonate (PFHpS)	µg/L	0.002	-	<0.002
Perfluorooctane sulfonate (PFOS)	µg/L	0.002	-	<0.002
Sum of PFHxS and PFOS	µg/L	0.002	-	<0.002
Perfluorononane sulfonate (PFNS)	µg/L	0.002	-	<0.002
Perfluorodecane sulfonate (PFDS)	µg/L	0.002	-	<0.002
Perfluorododecane sulfonate (PFDoS)	µg/L	0.002	-	<0.002
1H,1H,2H,2H-Perfluorohexane sulfonate (4:2) (4:2 FTS)	µg/L	0.002	-	<0.002
1H,1H,2H,2H-Perfluorooctane sulfonate (6:2) (6:2 FTS)	µg/L	0.002	-	<0.002
1H,1H,2H,2H-Perfluorodecane sulfonate (8:2) (8:2 FTS)	µg/L	0.002	-	<0.002
Perfluoroctane sulfonamide (PFOSA)	µg/L	0.008	-	<0.008
N-Methylperfluoroctane sulfonamide (N-MeFOSA)	µg/L	0.01	-	<0.01
N-Ethylperfluoroctane sulfonamide (N-EtFOSA)	µg/L	0.01	-	<0.01
2-(N-Methylperfluorooctane sulfonamido)-ethanol (N-MeFOSE)	µg/L	0.01	-	<0.01
2-(N-Ethylperfluorooctane sulfonamido)-ethanol (N-EtFOSE)	µg/L	0.01	-	<0.01
N-Methylperfluorooctanesulfonamidoacetic acid (N_MeFOSAA)	µg/L	0.01	-	<0.01
N-Ethylperfluorooctanesulfonamidoacetic Acid (N-EtFOSAA)	µg/L	0.01	-	<0.01
(13C4-PFBA) Surrogate	%	-	-	**118**
(13C5-PFPeA) Surrogate	%	-	-	**107**
(13C5-PFHxA) Surrogate	%	-	-	**127**
(13C4-PFHpA) Surrogate	%	-	-	**117**
(13C4_PFOA) Surrogate	%	-	-	**122**
(13C9-PFNA) Surrogate	%	-	-	**88**
(13C6-PFDA) Surrogate	%	-	-	**120**
(13C7-PFUdA) Surrogate	%	-	-	**103**
(13C2-PFDoA) Surrogate	%	-	-	**82**
(13C2_PFTeDA) Surrogate	%	-	-	**49**
(13C2-PFHxDA) Surrogate	%	-	-	**28**
(13C3-PFBS) Surrogate	%	-	-	**133**
(13C3-PFHxS) Surrogate	%	-	-	**128**
(13C8-PFOS) Surrogate	%	-	-	**96**
(13C2-4:2 FTS) Surrogate	%	-	-	**105**
(13C2-6:2 FTS) Surrogate	%	-	-	**104**
(13C2-8:2 FTS) Surrogate	%	-	-	**95**
(13C8-PFOSA) Surrogate	%	-	-	**114**
(D3-N-MeFOSA) Surrogate	%	-	-	**113**
(D5-N-EtFOSA) Surrogate	%	-	-	**79**
(D7-N-MeFOSE) Surrogate	%	-	-	**102**
(D9-N-EtFOSE) Surrogate	%	-	-	**99**
(D3-N-MeFOSAA) Surrogate	%	-	-	**74**
(D5-N-EtFOSAA) Surrogate	%	-	-	**73**

Moisture Content Method: AN002 Tested: 2/5/2019

Parameter	Units	LOR	Sample Number Sample Matrix Sample Date Sample Name	ME310282.025 Soil 17 Apr 2019 QC03	ME310282.026 Water 17 Apr 2019 Rinsate_170419
Moisture Content Method: AN002 Tested: 3/5/2019 (continued)					
% Moisture*	%w/w	1		11.0	-

MB blank results are compared to the Limit of Reporting
LCS and MS spike recoveries are measured as the percentage of analyte recovered from the sample compared the the amount of analyte spiked into the sample.
DUP and MSD relative percent differences are measured against their original counterpart samples according to the formula : *the absolute difference of the two results divided by the average of the two results as a percentage.* Where the DUP RPD is 'NA' , the results are less than the LOR and thus the RPD is not applicable.

Moisture Content Method: ME-(AU)-[ENV]AN002

Parameter	QC Reference	Units	LOR	DUP %RPD
% Moisture*	LB026279	%w/w	1	5 - 14%

Per- and Polyfluoroalkyl Substances (PFAS) in Aqueous Samples Method: MA-1523

Parameter	QC Reference	Units	LOR	MB	DUP %RPD	LCS %Recovery	MS %Recovery	MSD %RPD
Perfluorobutanoic acid (PFBA)	LB026277	µg/L	0.002	<0.002	0%	NA	NA	NA
Perfluoropentanoic acid (PFPeA)	LB026277	µg/L	0.002	<0.002	0%	NA	NA	NA
Perfluorohexanoic acid (PFHxA)	LB026277	µg/L	0.002	<0.002	0%	NA	NA	NA
Perfluoroheptanoic acid (PFHpA)	LB026277	µg/L	0.002	<0.002	0%	105%	95%	5%
Perfluorooctanoic Acid (PFOA)	LB026277	µg/L	0.001	<0.001	0%	123%	116%	12%
Perfluorononanoic acid (PFNA)	LB026277	µg/L	0.004	<0.004	0%	93%	91%	24%
Perfluorodecanoic acid (PFDA)	LB026277	µg/L	0.004	<0.004	0%	140%	114%	2%
Perfluoroundecanoic acid (PFUnA)	LB026277	µg/L	0.004	<0.004	0%	103%	103%	1%
Perfluorododecanoic acid (PFDoA)	LB026277	µg/L	0.004	<0.004	0%	126%	109%	19%
Perfluorotridecanoic acid (PFTrDA)	LB026277	µg/L	0.004	<0.004	0%	140%	114%	18%
Perfluorotetradecanoic acid (PFTeDA)	LB026277	µg/L	0.004	<0.004	0%	84%	63%	29%
Perfluorohexadecanoic acid (PFHxDA)	LB026277	µg/L	0.008	<0.008	0%	NA	NA	NA
Perfluorobutane sulfonate (PFBS)	LB026277	µg/L	0.004	<0.004	0%	NA	NA	NA
Perfluoropentane sulfonate (PFPeS)	LB026277	µg/L	0.004	<0.004	0%	NA	NA	NA
Perfluorohexane sulfonate (PFHxS)	LB026277	µg/L	0.002	<0.002	0%	NA	NA	NA
Perfluoroheptane sulfonate (PFHpS)	LB026277	µg/L	0.002	<0.002	0%	NA	NA	NA
Perfluorooctane sulfonate (PFOS)	LB026277	µg/L	0.002	<0.002	0%	100%	106%	9%
Sum of PFHxS and PFOS	LB026277	µg/L	0.002	<0.002	0%	NA	NA	NA
Perfluorononane sulfonate (PFNS)	LB026277	µg/L	0.002	<0.002	0%	NA	NA	NA
Perfluorodecane sulfonate (PFDS)	LB026277	µg/L	0.002	<0.002	0%	NA	NA	NA
Perfluorododecane sulfonate (PFDoS)	LB026277	µg/L	0.002	<0.002	0%	NA	NA	NA
1H,1H,2H,2H-Perfluorohexane sulfonate (4:2) (4:2 FTS)	LB026277	µg/L	0.002	<0.002	0%	NA	NA	NA
1H,1H,2H,2H-Perfluorooctane sulfonate (6:2) (6:2 FTS)	LB026277	µg/L	0.002	<0.002	0%	NA	NA	NA
1H,1H,2H,2H-Perfluorodecane sulfonate (8:2) (8:2 FTS)	LB026277	µg/L	0.002	<0.002	0%	NA	NA	NA
Perfluoroctane sulfonamide (PFOSA)	LB026277	µg/L	0.008	<0.008	0%			
N-Methylperfluoroctane sulfonamide (N-MeFOSA)	LB026277	µg/L	0.01	<0.01	0%	NA	NA	NA
N-Ethylperfluoroctane sulfonamide (N-EtFOSA)	LB026277	µg/L	0.01	<0.01	0%	NA	NA	NA
2-(N-Methylperfluorooctane sulfonamido)-ethanol (N-MeFOSE)	LB026277	µg/L	0.01	<0.01	0%	NA	NA	NA
2-(N-Ethylperfluorooctane sulfonamido)-ethanol (N-EtFOSE)	LB026277	µg/L	0.01	<0.01	0%	NA	NA	NA
N-Methylperfluorooctanesulfonamidoacetic acid (N_MeFOSAA)	LB026277	µg/L	0.01	<0.01	0%	NA	NA	NA
N-Ethylperfluorooctanesulfonamidoacetic Acid (N-EtFOSAA)	LB026277	µg/L	0.01	<0.01	0%	NA	NA	NA
(13C4-PFBA) Surrogate	LB026277	%	-	116%	2%	116%	114%	3%
(13C5-PFPeA) Surrogate	LB026277	%	-	104%	2%	105%	106%	0%
(13C5-PFHxA) Surrogate	LB026277	%	-	117%	6%	114%	112%	15%
(13C4-PFHpA) Surrogate	LB026277	%	-	120%	9%	108%	111%	21%
(13C4_PFOA) Surrogate	LB026277	%	-	111%	10%	102%	109%	29%
(13C9-PFNA) Surrogate	LB026277	%	-	110%	11%	116%	108%	14%
(13C6-PFDA) Surrogate	LB026277	%	-	103%	8%	85%	96%	3%
(13C7-PFUdA) Surrogate	LB026277	%	-	94%	6%	101%	91%	5%
(13C2-PFDoA) Surrogate	LB026277	%	-	87%	3%	87%	88%	9%
(13C2_PFTeDA) Surrogate	LB026277	%	-	81%	0%	86%	82%	1%
(13C2-PFHxDA) Surrogate	LB026277	%	-	62%	10%	83%	71%	17%
(13C3-PFBS) Surrogate	LB026277	%	-	130%	7%	118%	116%	9%
(13C3-PFHxS) Surrogate	LB026277	%	-	134%	23%	108%	105%	11%
(13C8-PFOS) Surrogate	LB026277	%	-	130%	26%	131%	117%	12%
(13C2-4:2 FTS) Surrogate	LB026277	%	-	108%	7%	95%	96%	1%
(13C2-6:2 FTS) Surrogate	LB026277	%	-	110%	2%	98%	101%	6%
(13C2-8:2 FTS) Surrogate	LB026277	%	-	101%	11%	80%	75%	6%
(13C8-PFOSA) Surrogate	LB026277	%	-	123%	24%	128%	125%	4%
(D3-N-MeFOSA) Surrogate	LB026277	%	-	132%	17%	125%	112%	6%
(D5-N-EtFOSA) Surrogate	LB026277	%	-	147%	9%	131%	115%	1%

QC SUMMARY

MB blank results are compared to the Limit of Reporting
LCS and MS spike recoveries are measured as the percentage of analyte recovered from the sample compared the the amount of analyte spiked into the sample.
DUP and MSD relative percent differences are measured against their original counterpart samples according to the formula : *the absolute difference of the two results divided by the average of the two results as a percentage.* Where the DUP RPD is 'NA' , the results are less than the LOR and thus the RPD is not applicable.

Per- and Polyfluoroalkyl Substances (PFAS) in Aqueous Samples Method: MA-1523 (continued)

				MB	DUP %RPD	LCS %Recovery	MS %Recovery	MSD %RPD
(D7-N-MeFOSE) Surrogate	LB026277	%	-	124%	12%	119%	111%	2%
(D9-N-EtFOSE) Surrogate	LB026277	%	-	127%	12%	123%	116%	0%
(D3-N-MeFOSAA) Surrogate	LB026277	%	-	94%	7%	119%	89%	9%
(D5-N-EtFOSAA) Surrogate	LB026277	%	-	95%	11%	95%	80%	24%

MB blank results are compared to the Limit of Reporting
LCS and MS spike recoveries are measured as the percentage of analyte recovered from the sample compared the the amount of analyte spiked into the sample.
DUP and MSD relative percent differences are measured against their original counterpart samples according to the formula : *the absolute difference of the two results divided by the average of the two results as a percentage.* Where the DUP RPD is 'NA' , the results are less than the LOR and thus the RPD is not applicable.

Per- and Polyfluoroalkyl Substances (PFAS) in Solid Samples- Low level Method: MA-1523

Parameter	QC Reference	Units	LOR	MB	DUP %RPD	LCS %Recovery	MS %Recovery	MSD %RPD
Perfluorobutanoic acid (PFBA)	LB026235	mg/kg	0.0001	<0.0001	0%	NA	NA	NA
Perfluoropentanoic acid (PFPeA)	LB026235	mg/kg	0.0005	<0.0005	0%	NA	NA	NA
Perfluorohexanoic acid (PFHxA)	LB026235	mg/kg	0.0001	<0.0001	0%	NA	NA	NA
Perfluoroheptanoic acid (PFHpA)	LB026235	mg/kg	0.0001	<0.0001	0%	81 - 107%	56 - 102%	4 - 9%
Perfluorooctanoic Acid (PFOA)	LB026235	mg/kg	0.0001	<0.0001	0 - 5%	109%	84 - 109%	5 - 29%
Perfluorononanoic acid (PFNA)	LB026235	mg/kg	0.0001	<0.0001	0%	69 - 86%	41 - 94%	6 - 23%
Perfluorodecanoic acid (PFDA)	LB026235	mg/kg	0.0001	<0.0001	0 - 30%	109%	90 - 96%	15 - 19%
Perfluoroundecanoic acid (PFUnA)	LB026235	mg/kg	0.0001	<0.0001	0 - 88%	86 - 93%	53 - 98%	3 - 7%
Perfluorododecanoic acid (PFDoA)	LB026235	mg/kg	0.0001	<0.0001	0 - 28%	97 - 100%	93 - 107%	17 - 56%
Perfluorotridecanoic acid (PFTrDA)	LB026235	mg/kg	0.0001	<0.0001	0%	105 - 125%	102%	25%
Perfluorotetradecanoic acid (PFTeDA)	LB026235	mg/kg	0.0001	<0.0001	0%	71 - 93%	85 - 102%	36 - 53%
Perfluorohexadecanoic acid (PFHxDA)	LB026235	mg/kg	0.0001	<0.0001	0%	NA	NA	NA
Perfluorobutane sulfonate (PFBS)	LB026235	mg/kg	0.0001	<0.0001	0%	NA	NA	NA
Perfluoropentane sulfonate (PFPeS)	LB026235	mg/kg	0.0001	<0.0001	0%	NA	NA	NA
Perfluorohexane sulfonate (PFHxS)	LB026235	mg/kg	0.0001	<0.0001	0%	NA	NA	NA
Perfluoroheptane sulfonate (PFHpS)	LB026235	mg/kg	0.0001	<0.0001	0%	NA	NA	NA
Perfluorooctane sulfonate (PFOS)	LB026235	mg/kg	0.0001	<0.0001	0 - 32%	85 - 104%	113 - 140%	6 - 34%
Sum PFOS and PFHXS	LB026235	mg/kg	0.0001	<0.0001	0 - 32%	NA	NA	NA
Perfluorononane sulfonate (PFNS)	LB026235	mg/kg	0.0001	<0.0001	0%	NA	NA	NA
Perfluorodecane sulfonate (PFDS)	LB026235	mg/kg	0.0001	<0.0001	0%	NA	NA	NA
Perfluorododecane sulfonate (PFDoS)	LB026235	mg/kg	0.0001	<0.0001	0%	NA	NA	NA
1H,1H,2H,2H-Perfluorohexane sulfonate (4:2) (4:2 FTS)	LB026235	mg/kg	0.001	<0.001	0%	NA	NA	NA
1H,1H,2H,2H-Perfluorooctane sulfonate (6:2) (6:2 FTS)	LB026235	mg/kg	0.001	<0.001	0%	NA	NA	NA
1H,1H,2H,2H-Perfluorodecane sulfonate (8:2) (8:2 FTS)	LB026235	mg/kg	0.001	<0.001	0%	NA	NA	NA
Perfluoroctane sulfonamide (PFOSA)	LB026235	mg/kg	0.001	<0.001	0%			
N-Methylperfluoroctane sulfonamide (N-MeFOSA)	LB026235	mg/kg	0.001	<0.001	0%	NA	NA	NA
N-Ethylperfluoroctane sulfonamide (N-EtFOSA)	LB026235	mg/kg	0.001	<0.001	0%	NA	NA	NA
2-(N-Methylperfluorooctane sulfonamido)-ethanol (N-MeFOSE)	LB026235	mg/kg	0.002	<0.002	0%	NA	NA	NA
2-(N-Ethylperfluorooctane sulfonamido)-ethanol (N-EtFOSE)	LB026235	mg/kg	0.002	<0.002	0%	NA	NA	NA
N-Methylperfluorooctanesulfonamidoacetic acid (N_MeFOSAA)	LB026235	mg/kg	0.001	<0.001	0 - 6%	NA	NA	NA
N-Ethylperfluorooctanesulfonamidoacetic Acid (N-EtFOSAA)	LB026235	mg/kg	0.001	<0.001	0 - 51%	NA	NA	NA
(13C4-PFBA) Surrogate	LB026235	%	-	55 - 73%	5 - 25%	51 - 78%	64 - 116%	26%
(13C5_PFPeA) Surrogate	LB026235	%	-	55 - 82%	9 - 22%	43 - 74%	72 - 226%	17 - 40%
(13C5-PFHxA) Surrogate	LB026235	%	-	50 - 67%	5 - 22%	47 - 79%	57 - 175%	32 - 36%
(13C4-PFHpA) Surrogate	LB026235	%	-	52 - 84%	6 - 29%	47 - 62%	54 - 364%	44 - 51%
(13C4-PFOA) Surrogate	LB026235	%	-	45 - 59%	3 - 12%	39 - 63%	56 - 120%	36 - 41%
(13C9-PFNA) Surrogate	LB026235	%	-	44 - 65%	11 - 61%	52 - 61%	52 - 159%	11 - 22%
(13C6-PFDA) Surrogate	LB026235	%	-	31 - 49%	7 - 18%	40 - 46%	60 - 142%	39 - 64%
(13C7-PFUdA) Surrogate	LB026235	%	-	22 - 39%	1 - 6%	34 - 46%	49 - 59%	20 - 48%
(13C2-PFDoA) Surrogate	LB026235	%	-	17 - 25%	10 - 36%	25 - 33%	14 - 36%	26 - 45%
(13C2-PFTeDA) Surrogate	LB026235	%	-	15 - 20%	1 - 68%	21 - 30%	2 - 30%	39 - 85%
(13C2-PFHxDA) Surrogate	LB026235	%	-	5 - 9%	15 - 38%	17 - 19%	10 - 36%	9 - 37%
(13C3-PFBS) Surrogate	LB026235	%	-	62 - 63%	4 - 14%	43 - 69%	57 - 109%	19 - 23%
(13C3-PFHxS) Surrogate	LB026235	%	-	58 - 68%	9 - 12%	47 - 73%	59 - 93%	7 - 23%
(13C8-PFOS) Surrogate	LB026235	%	-	47 - 57%	9 - 25%	45 - 60%	55 - 88%	7 - 41%
(13C2-4:2FTS) Surrogate	LB026235	%	-	55 - 63%	7 - 12%	43 - 66%	62 - 102%	5 - 25%
(13C2-6:2FTS) Surrogate	LB026235	%	-	60 - 72%	8 - 16%	48 - 73%	61 - 223%	7 - 10%
(13C2-8:2FTS) Surrogate	LB026235	%	-	42 - 59%	16 - 33%	39 - 52%	51 - 181%	18 - 23%
(13C8-PFOSA) Surrogate	LB026235	%	-	37 - 46%	6 - 18%	35 - 53%	3 - 46%	26 - 48%
(D3-N-MeFOSA) Surrogate	LB026235	%	-	14 - 16%	16 - 64%	13 - 22%	4 - 19%	35 - 61%
(D5-N-EtFOSA) Surrogate	LB026235	%	-	11 - 12%	11 - 20%	8 - 16%	9 - 16%	38 - 55%
(D7-N-MeFOSE) Surrogate	LB026235	%	-	22 - 35%	46 - 120%	23 - 38%	31 - 41%	27 - 42%
(D9-N-EtFOSE) Surrogate	LB026235	%	-	19 - 21%	14 - 44%	15 - 28%	3 - 60%	60 - 96%
(D3-N-MeFOSAA) Surrogate	LB026235	%	-	23 - 51%	26 - 36%	34 - 46%	19 - 41%	25 - 41%
(D5-N-EtFOSAA) Surrogate	LB026235	%	-	22 - 50%	10 - 73%	29 - 41%	7 - 41%	35 - 88%

METHOD SUMMARY

METHOD	METHODOLOGY SUMMARY
AN002	The test is carried out by drying (at either 40°C or 105°C) a known mass of sample in a weighed evaporating basin. After fully dry the sample is re-weighed. Samples such as sludge and sediment having high percentages of moisture will take some time in a drying oven for complete removal of water.
MA-1523	This method covers the analysis of per- and polyfluoroalkyl substances (PFAS) in aqueous, solid and biosolid samples and solvent extracts, determined as the total of linear and branched isomers. After spiking with isotopically labelled quantification surrogates and clean-up via SPE cartridges sample extracts are analysed by liquid chromatography/mass spectrometry (LC-MS/MS). PFAS concentrations are determined by isotope dilution quantification.

FOOTNOTES

IS	Insufficient sample for analysis.	LOR	Limit of Reporting
LNR	Sample listed, but not received.	↑↓	Raised or Lowered Limit of Reporting
*	NATA accreditation does not cover the performance of this service.	QFH	QC result is above the upper tolerance
		QFL	QC result is below the lower tolerance
**	Indicative data, theoretical holding time exceeded.	-	The sample was not analysed for this analyte
		NVL	Not Validated

Unless it is reported that sampling has been perfomed by SGS, the samples have been analysed as received.
Solid samples expressed on a dry weight basis.

Where "Total" analyte groups are reported (for example, Total PAHs, Total OC Pesticides) the total will be calculated as the sum of the individual analytes, with those analytes that are reported as <LOR being assumed to be zero. The summed (Total) limit of reporting is calcuated by summing the individual analyte LORs and dividing by two. For example, where 16 individual analytes are being summed and each has an LOR of 0.1 mg/kg, the "Totals" LOR will be 1.6 / 2 (0.8 mg/kg). Where only 2 analytes are being summed, the " Total" LOR will be the sum of those two LORs.

Some totals may not appear to add up because the total is rounded after adding up the raw values.

If reported, measurement uncertainty follow the ± sign after the analytical result and is expressed as the expanded uncertainty calculated using a coverage factor of 2, providing a level of confidence of approximately 95%, unless stated otherwise in the comments section of this report.

Results reported for samples tested under test methods with codes starting with ARS-SOP, radionuclide or gross radioactivity concentrations are expressed in becquerel (Bq) per unit of mass or volume or per wipe as stated on the report. Becquerel is the SI unit for activity and equals one nuclear transformation per second.
Note that in terms of units of radioactivity:

a. 1 Bq is equivalent to 27 pCi
b. 37 MBq is equivalent to 1 mCi

For results reported for samples tested under test methods with codes starting with ARS-SOP, less than (<) values indicate the detection limit for each radionuclide or parameter for the measurement system used. The respective detection limits have been calculated in accordance with ISO 11929.

The QC and MU criteria are subject to internal review according to the SGS QAQC plan and may be provided on request or alternatively can be found here: www.sgs.com.au.pv.sgsvr/en-gb/environment.

Annexure F

QA/QC report

QUALITY ASSURANCE AND QUALITY CONTROL REPORT

Project number:	J17188	**Matrix type:**	Water, Soil
Client:	Snowy Hydro Ltd	**Samples:**	8, 27
Site(s):	Polo Flats Airfield	**Laboratory:**	ALS (groundwater - primary) SGS (soil - primary) Envirolab (soil - secondary)
Sampling Events:	Soil – April 2019 Groundwater – May 2019	**Lab reference:**	CA1903638 (ALS) SE192028 (SGS) 216239 (Envirolab)
Validation by:	L Lewis	**Date:**	8/08/2019
Verification by:		**Date:**	

Field QA/QC

Sampling personnel	Groundwater sampling was conducted by EMM (C. Corthier) on 31 May 2019. Soil sampling was conducted by Robson Environmental Pty Ltd (A. Hannan-Joyner) on 7 April 2019.
Sampling Methodology	Water samples were collected using grab sample technique with a plastic bailer. Soil samples were collected using a shovel and hand auger.
Chain of Custody (COC)	Chain on custody documents were completed by EMM (C. Corthier) for groundwater and by Robson Environmental Pty Ltd (A. Hannan-Joyner) for soil.
Analysis Request	Laboratory analysis request and sample receipt notification reviewed and approved by EMM.
Field Blanks *(FB01)*	Field blank samples were collected at a frequency of one per day of sampling (one in total). Concentrations were reported below the Limit of Reporting (LOR) for all analytes tested. It is noted that no field blank samples were collected during the groundwater sampling.
Rinsate Blanks *(Rinsate_170419)*	Rinsate blank samples were collected at a frequency of one per day of sampling (one in total). Concentrations reported below the LOR for all analytes tested. Rinsate sample name was collected from the auger flight. It is noted that no rinsate blank samples were collected during the groundwater sampling.
Trip Blanks *(TB01)*	Trip blanks were included at frequency of one per cooler (one in total). Concentrations were not detected above the LOR for all analytes tested. It is noted that no trip blank samples were collected during the groundwater sampling.
Trip Spikes *(TS01)*	Trip spikes were included at frequency of one per day of sampling (one in total). Recoveries were within acceptable control limits. It is noted that no trip spike samples were collected during the groundwater sampling.
Frequency of field QC	Intra- and inter-laboratory field duplicate samples were collected at a frequency of one in twenty primary samples (two of each in total). No field duplicate samples were collected during the groundwater sampling.
Handling and preservation	Groundwater samples were received at the laboratory. However, no sample receipt temperature was taken. In the event that the sample temperatures were not preserved within the recommended range (≤6°C), this would not be considered to compromise overall data integrity as the Contaminants of Potential Concern (CoPC) are non-volatile and therefore not prone to thermal volatilisation (with the exception of PCB – see comments below). Soil samples were received preserved and chilled at the laboratory. Sample receipt temperature (6.7°C) was not within the recommended range (≤6°C) in primary batch – see comments below. The inter-laboratory duplicate sample was received at the secondary laboratory at an elevated temperature (15.4°C). It is likely that the temperature exceedances are due to transport of the samples to the laboratories, received one week after sampling. However, it was noted that ice was present. All samples were received at the laboratory in appropriate sample containers.

QUALITY ASSURANCE AND QUALITY CONTROL REPORT

Project number:	J17188	**Matrix type:**	Water, Soil
Client:	Snowy Hydro Ltd	**Samples:**	8, 27
Site(s):	Polo Flats Airfield	**Laboratory:**	ALS (groundwater - primary) SGS (soil - primary) Envirolab (soil - secondary)
Sampling Events:	Soil – April 2019 Groundwater – May 2019	**Lab reference:**	CA1903638 (ALS) SE192028 (SGS) 216239 (Envirolab)
Validation by:	L Lewis	**Date:**	8/08/2019
Verification by:		**Date:**	

Laboratory QA/QC

Tests requested/reported	Samples were analysed and reported as requested on the COC.
Holding time compliance	Samples were extracted and analysed within recommended holding times, with the following exceptions: *Soil* - OCP/OPP, PAH, PCBs, TRH and VOCs for Rinsate_170419 - VOCs for FB01 The minor holding time breaches (2 days overdue) are not expected to impact the overall data integrity as these are QA/QC samples and not primary samples. Other QA/QC results met holding time requirements and no anomalies were identified. *Water* - pH for all samples The holding time breach (4 days overdue) is for pH which is a water quality parameter and not a CoPC, thus having no material impact on data integrity.
Laboratory Accreditation	The laboratory analysis was conducted by ALS Environmental Pty Ltd (Canberra, Sydney and Newcastle) for groundwater and SGS Australia Pty Ltd (Sydney) for soil, both National Association of Testing Authorities (NATA) accredited laboratories. The duplicate samples were analysed by Envirolab Services Pty Ltd (Sydney), also a NATA accredited laboratory.
Frequency of laboratory QC	The laboratories reported a sufficient frequency of quality control samples to assess whether the results have been reported to an acceptable accuracy and precision.
Method Blank	*Soil* Method blank concentrations were not detected above the LOR for all analytes tested. *Water* Method blank concentrations were not detected above the LOR for all analytes
Laboratory duplicate RPDs	*Soil* **SGS -** Laboratory duplicate (LD) Relative Percentage Differences (RPD) were within control limits exception of the following: - Mercury and Total Recoverable Elements by ICPOES The laboratory duplicate RPDs are presented in the laboratory QA/QC report. Given that other QA/QC were within control limits, this is not expected to have a material impact on data integrity. **Envirolab -** LD were conducted RPD were within control limits. The laboratory duplicate RPDs are presented in the laboratory Quality Control report. *Water* **ALS -** LD RPD were within control limits. The laboratory duplicate RPDs are presented in the laboratory Quality Control Report.
Laboratory control spike recovery	*Soil* Laboratory Control Spikes (LCS) recoveries were within control limits. *Water* LCS recoveries were within control limits.

QUALITY ASSURANCE AND QUALITY CONTROL REPORT

Project number:	J17188	**Matrix type:**	Water, Soil
Client:	Snowy Hydro Ltd	**Samples:**	8, 27
Site(s):	Polo Flats Airfield	**Laboratory:**	ALS (groundwater - primary) SGS (soil - primary) Envirolab (soil - secondary)
Sampling Events:	Soil – April 2019 Groundwater – May 2019	**Lab reference:**	CA1903638 (ALS) SE192028 (SGS) 216239 (Envirolab)
Validation by:	L Lewis	**Date:**	8/08/2019
Verification by:		**Date:**	

Matrix spike recovery	<u>*Soil*</u> Matrix spike (MS) recoveries (where reported) were within control limits. <u>*Water*</u> MS recoveries (where reported) were within control limits.
Surrogate spike recovery	<u>*Soil*</u> Surrogate spike recoveries were within control limits. <u>*Water*</u> Surrogate spike recoveries were within control limits.

Data Validation

Comparison of Field Observations and Laboratory Results	No anomalous results between field observations and analysis results were noted.
Data transcription	A random check of the laboratory results identified no anomalies between the electronic data, the laboratory reports, and tables generated by EMM
Limits of Reporting (LOR)	LORs were sufficiently low to enable assessment against adopted guideline criteria.
Intra-laboratory duplicate RPDs *S05_0-0.1 / QC01* *S15_0-0.1 / QC03*	Field duplicate RPDs were reported within control limits with the exception of the following: - Arsenic, Cadmium, Mercury, Nickel, Zinc and Arochlor-1254 for QC01 - PFBA and PFOS for QC03
Inter-laboratory duplicate RPDs *S05_0-0.1 / QC02* *S15_0-0.1 / QC04*	Field triplicate RPDs were reported within control limits with the exception of the following: - Cadmium, Zinc, TRH C16-34 and C34-C40 for QC02 - TRH C16-C34, Fluoranthene and Pyrene for QC04.

Chromatograms

N/A

Comments

Based on a review by an EMM suitably qualified environmental professional, it is considered that an acceptable degree of QA/QC information has been collected and reported in accordance with the laboratories internal standard operating procedures. Despite the minor variations/outliers summarised above, the laboratory data are considered to provide confidence in the accuracy, comparability, completeness and precision of the analytical results.

However, it is noted that all field QA/QC samples were collected during the soil sampling event, and none were collecting during the groundwater sampling event.

Additionally, it is uncertain if groundwater samples were received preserved and chilled within the recommended temperature at the laboratory. As PCB can be prone to volatilisation, this may be noted as a limitation when interpreting the results for this particular CoPC.

		Lab Report Number	SE192028	SE192028		SE192028	216239		SE192028	SE192028		SE192028	216239	
		Field ID	S05_0-0.1	QC01		S05_0-0.1	QC02		S15_0-0.1	QC03		S15_0-0.1	QC04	
		Matrix Type	Soil	Soil		Soil	Soil		Soil	Soil		Soil	Soil	
		Date	17/04/2019	17/04/2019	RPD	17/04/2019		RPD	17/04/2019	17/04/2019	RPD	17/04/2019		RPD
	Unit	EQL												
Inorganics														
% Moisture	mg/kg	5,000	**280,000**	**270,000**	4	**280,000**			**110,000**	**120,000**	9	**110,000**		
Moisture	%	0.1					**26**						**9.5**	
Metals														
Arsenic	mg/kg	1	**3**	**6**	**67**	**3**	<4	nc	**4**	**5**	22	**4**	<4	nc
Cadmium	mg/kg	0.3	**1.9**	**2.7**	**35**	**1.9**	**3**	**45**	<0.3	<0.3	0	<0.3	<0.4	0
Chromium (III+VI)	mg/kg	0.3	**45**	**59**	27	**45**	**57**	24	**70**	**72**	3	**70**	**72**	3
Copper	mg/kg	0.5	**64**	**74**	14	**64**	**85**	28	**38**	**39**	3	**38**	**37**	3
Lead	mg/kg	1	**110**	**140**	24	**110**	**130**	17	**140**	**170**	19	**140**	**140**	0
Mercury	mg/kg	0.05	**0.11**	**0.08**	**32**	**0.11**	<0.1	nc	<0.05	<0.05	0	<0.05	<0.1	0
Nickel	mg/kg	0.5	**47**	**65**	**32**	**47**	**59**	23	**67**	**68**	1	**67**	**68**	1
Zinc	mg/kg	1	**1,300**	**1,800**	**32**	**1,300**	**1,900**	**38**	**66**	**70**	6	**66**	**60**	10
Asbestos														
Asbestos fibres	Detect	0	**0**			**0**								
Asbestos in soil (<2mm AF/FA)	%w/w	0.001	<0.001			<0.001								
Asbestos in soil (<7mm AF/FA)	%	0.001	<0.001			<0.001								
Asbestos in soil (>2mm <7mm AF/FA)	%w/w	0.001	<0.001			<0.001								
Mass ACM	g	0.01	<0.01			<0.01								
Mass asbestos in AF	g	0.0001	<0.0001			<0.0001								
Mass Asbestos in FA & AF	g	0.0001	<0.0001			<0.0001								
NA														
Perfluorobutanesulfonate	mg/kg	0.0001	<0.0001	<0.0001	0				<0.0001	<0.0001	0			
ACM>7mm Estimation % (w/w)*	%w/w		<0.01			<0.01								
weight of sample	g	1	**437**			**437**								
BTEX														
Benzene	mg/kg	0.1	<0.1	<0.1	0	<0.1	<0.2	0	<0.1	<0.1	0	<0.1	<0.2	0
Ethylbenzene	mg/kg	0.1	<0.1	<0.1	0	<0.1	<1	0	<0.1	<0.1	0	<0.1	<1	0
Toluene	mg/kg	0.1	<0.1	<0.1	0	<0.1	<0.5	0	<0.1	<0.1	0	<0.1	<0.5	0
Total BTEX	mg/kg	0.6	<0.6	<0.6	0	<0.6			<0.6	<0.6	0	<0.6		
Xylene (m & p)	mg/kg	0.2	<0.2	<0.2	0	<0.2	<2	0	<0.2	<0.2	0	<0.2	<2	0
Xylene (o)	mg/kg	0.1	<0.1	<0.1	0	<0.1	<1	0	<0.1	<0.1	0	<0.1	<1	0
Xylene Total	mg/kg	0.3	<0.3	<0.3	0	<0.3	<1	0	<0.3	<0.3	0	<0.3	<1	0
PFOS/PFOA														
4:2 Fluorotelomer sulfonic acid (4:2 FTS)	µg/kg	1	<1	<1	0				<1	<1	0			
6:2 Fluorotelomer Sulfonate (6:2 FTS)	µg/kg	1	<1	<1	0				<1	<1	0			
N-Ethyl perfluorooctane sulfonamide (NEtFOSA)	µg/kg	1	<1	<1	0				<1	<1	0			
N-ethyl-perfluorooctanesulfonamidoacetic acid (NEtFOSAA)	µg/kg	1	<1	<1	0				<1	<1	0			
N-ethylperfluorooctanesulfonamidoethanol (NEtFOSE)	µg/kg	2	<2	<2	0				<2	<2	0			
N-Methyl perfluorooctane sulfonamide (NMeFOSA)	µg/kg	1	<1	<1	0				<1	<1	0			
N-methylperfluorooctane sulfonamidoacetic acid (NMeFOSAA)	µg/kg	1	<1	<1	0				<1	<1	0			
N-Methylperfluorooctanesulfonamidoethanol (N-MeFOSE)	mg/kg	0.002	<0.002	<0.002	0				<0.002	<0.002	0			
Perfluoro-1-dodecanesulfonate	µg/kg	0.1	<0.1	<0.1	0				<0.1	<0.1	0			
Perfluorobutanoic acid (PFBA)	µg/kg	0.1	**0.1**	<0.1	nc				**0.3**	**0.2**	**40**			
6:2 Fluorotelomer sulfonic acid (6:2 FTS)	mg/kg	0.0001											<0.0001	
Perfluorodecanesulfonic acid (PFDS)	µg/kg	0.1	<0.1	<0.1	0				<0.1	<0.1	0			
8:2 Fluorotelomer sulfonic acid (8:2 FTS)	mg/kg	0.0001	<0.001	<0.001	0				<0.001	<0.001	0		<0.0001	
Perfluorodecanoic acid (PFDA)	µg/kg	0.1	<0.1	<0.1	0				<0.1	<0.1	0			
Perfluorohexane sulfonic acid (PFHxS)	µg/kg	0.1	<0.1	**0.2**	nc				<0.1	<0.1	0		<0.1	
Perfluorododecanoic acid (PFDoDA)	µg/kg	0.1	<0.1	<0.1	0				<0.1	<0.1	0			
Perfluorooctanesulfonic acid (PFOS)	mg/kg	0.0001	**0.0070**	**0.0072**	3				**0.0002**	**0.0001**	**67**		**0.0003**	
Perfluoroheptane sulfonic acid (PFHpS)	µg/kg	0.1	<0.1	<0.1	0				<0.1	<0.1	0			
Perfluorooctanoic acid (PFOA)	mg/kg	0.0001	<0.0001	**0.0002**	nc				<0.0001	<0.0001	0		<0.0001	
Perfluoroheptanoic acid (PFHpA)	µg/kg	0.1	<0.1	<0.1	0				<0.1	<0.1	0			
Sum of PFAS	µg/kg	0.1											**0.3**	
Perfluorohexanoic acid (PFHxA)	µg/kg	0.1	<0.1	<0.1	0				<0.1	<0.1	0			
Sum of PFHxS and PFOS	µg/kg	0.1	**7.0**	**7.4**	6				**0.2**	**0.1**	**67**		**0.3**	
Perfluoro-n-hexadecanoic acid (PFHxDA)	µg/kg	0.1	<0.1	<0.1	0				<0.1	<0.1	0			
Sum of US EPA PFAS (PFOS + PFOA)*	µg/kg	0.1											**0.3**	
Perfluorononanesulfonic acid (PFNS)	µg/kg	0.1	<0.1	<0.1	0				<0.1	<0.1	0			
Perfluorononanoic acid (PFNA)	µg/kg	0.1	<0.1	<0.1	0				<0.1	<0.1	0			
Perfluorooctane sulfonamide (PFOSA)	µg/kg	1	<1	<1	0				<1	<1	0			
Perfluoropentane sulfonic acid (PFPeS)	µg/kg	0.1	<0.1	<0.1	0				<0.1	<0.1	0			
Perfluoropentanoic acid (PFPeA)	µg/kg	0.5	<0.5	<0.5	0				<0.5	<0.5	0			
Perfluorotetradecanoic acid (PFTeDA)	µg/kg	0.1	<0.1	<0.1	0				<0.1	<0.1	0			
Perfluorotridecanoic acid (PFTrDA)	µg/kg	0.1	<0.1	<0.1	0				<0.1	<0.1	0			
Perfluoroundecanoic acid (PFUnDA)	µg/kg	0.1	<0.1	<0.1	0				<0.1	<0.1	0			
TRH														
C10-C16	mg/kg	25	<25	<25	0	<25	<50	0	<25	<25	0	<25	<50	0
C10-C16 (F2 minus Naphthalene)	mg/kg	25	<25	<25	0	<25	<50	0	<25	<25	0	<25	<50	0
C10-C40 (Sum of total)	mg/kg	50	**500**	**660**	28	**500**	**1,000**	**67**	<210	<210	0	<210	**420**	**67**
C16-C34	mg/kg	90	**310**	**410**	28	**310**	**580**	**61**	<90	<90	0	<90	**280**	**103**
C34-C40	mg/kg	100	**200**	**240**	18	**200**	**430**	**73**	<120	<120	0	<120	**140**	15
C6-C10	mg/kg	25	<25	<25	0	<25	<25	0	<25	<25	0	<25	<25	0
C6-C10 (F1 minus BTEX)	mg/kg	25	<25	<25	0	<25	<25	0	<25	<25	0	<25	<25	0
Halogenated Benzenes														
Hexachlorobenzene	mg/kg	0.1	<0.1	<0.1	0	<0.1	<0.1	0	<0.1	<0.1	0	<0.1	<0.1	0
Organochlorine Pesticides														
2,4-DDT	mg/kg	0.1	<0.1	<0.1	0	<0.1			<0.1	<0.1	0	<0.1		
4,4-DDE	mg/kg	0.1	<0.1	<0.1	0	<0.1	<0.1	0	<0.1	<0.1	0	<0.1	<0.1	0
a-BHC	mg/kg	0.1	<0.1	<0.1	0	<0.1	<0.1	0	<0.1	<0.1	0	<0.1	<0.1	0
Aldrin	mg/kg	0.1	<0.1	<0.1	0	<0.1	<0.1	0	<0.1	<0.1	0	<0.1	<0.1	0
b-BHC	mg/kg	0.1	<0.1	<0.1	0	<0.1	<0.1	0	<0.1	<0.1	0	<0.1	<0.1	0
Chlordane (cis)	mg/kg	0.1	<0.1	<0.1	0	<0.1	<0.1	0	<0.1	<0.1	0	<0.1	<0.1	0
Chlordane (trans)	mg/kg	0.1					<0.1						<0.1	
d-BHC	mg/kg	0.1	<0.1	<0.1	0	<0.1	<0.1	0	<0.1	<0.1	0	<0.1	<0.1	0
DDD	mg/kg	0.1	<0.1	<0.1	0	<0.1	<0.1	0	<0.1	<0.1	0	<0.1	<0.1	0
DDT	mg/kg	0.1	<0.1	<0.1	0	<0.1	<0.1	0	<0.1	<0.1	0	<0.1	<0.1	0
DDT+DDE+DDD	mg/kg	0.1					<0.1						<0.1	
Dieldrin	mg/kg	0.1	<0.2	<0.2	0	<0.2	<0.1	0	<0.2	<0.2	0	<0.2	<0.1	0
Endosulfan I	mg/kg	0.1	<0.2	<0.2	0	<0.2	<0.1	0	<0.2	<0.2	0	<0.2	<0.1	0
Endosulfan II	mg/kg	0.1	<0.2	<0.2	0	<0.2	<0.1	0	<0.2	<0.2	0	<0.2	<0.1	0
Endosulfan sulphate	mg/kg	0.1	<0.1	<0.1	0	<0.1	<0.1	0	<0.1	<0.1	0	<0.1	<0.1	0
Endrin	mg/kg	0.1	<0.2	<0.2	0	<0.2	<0.1	0	<0.2	<0.2	0	<0.2	<0.1	0
Endrin aldehyde	mg/kg	0.1	<0.1	<0.1	0	<0.1	<0.1	0	<0.1	<0.1	0	<0.1	<0.1	0
Endrin ketone	mg/kg	0.1	<0.1	<0.1	0	<0.1			<0.1	<0.1	0	<0.1		
gamma-Chlordane	mg/kg	0.1	<0.1	<0.1	0	<0.1			<0.1	<0.1	0	<0.1		
g-BHC (Lindane)	mg/kg	0.1	<0.1	<0.1	0	<0.1	<0.1	0	<0.1	<0.1	0	<0.1	<0.1	0
Heptachlor	mg/kg	0.1	<0.1	<0.1	0	<0.1	<0.1	0	<0.1	<0.1	0	<0.1	<0.1	0
Heptachlor epoxide	mg/kg	0.1	<0.1	<0.1	0	<0.1	<0.1	0	<0.1	<0.1	0	<0.1	<0.1	0
Methoxychlor	mg/kg	0.1	<0.1	<0.1	0	<0.1	<0.1	0	<0.1	<0.1	0	<0.1	<0.1	0
o,p-DDD	mg/kg	0.1	<0.1	<0.1	0	<0.1			<0.1	<0.1	0	<0.1		
o,p'-DDE	mg/kg	0.1	<0.1	<0.1	0	<0.1			<0.1	<0.1	0	<0.1		
trans-Nonachlor	mg/kg	0.1	<0.1	<0.1	0	<0.1			<0.1	<0.1	0	<0.1		
Organophosphorous Pesticides														
Azinophos methyl	mg/kg	0.1	<0.2	<0.2	0	<0.2	<0.1	0	<0.2	<0.2	0	<0.2	<0.1	0
Bromophos-ethyl	mg/kg	0.1	<0.2	<0.2	0	<0.2	<0.1	0	<0.2	<0.2	0	<0.2	<0.1	0
Chlorpyrifos	mg/kg	0.1	<0.2	<0.2	0	<0.2	<0.1	0	<0.2	<0.2	0	<0.2	<0.1	0
Chlorpyrifos-methyl	mg/kg	0.1					<0.1						<0.1	
Diazinon	mg/kg	0.1	<0.5	<0.5	0	<0.5	<0.1	0	<0.5	<0.5	0	<0.5	<0.1	0
Dichlorvos	mg/kg	0.1	<0.5	<0.5	0	<0.5	<0.1	0	<0.5	<0.5	0	<0.5	<0.1	0
Dimethoate	mg/kg	0.1	<0.5	<0.5	0	<0.5	<0.1	0	<0.5	<0.5	0	<0.5	<0.1	0
Ethion	mg/kg	0.1	<0.2	<0.2	0	<0.2	<0.1	0	<0.2	<0.2	0	<0.2	<0.1	0
Fenitrothion	mg/kg	0.1	<0.2	<0.2	0	<0.2	<0.1	0	<0.2	<0.2	0	<0.2	<0.1	0
Malathion	mg/kg	0.1	<0.2	<0.2	0	<0.2	<0.1	0	<0.2	<0.2	0	<0.2	<0.1	0
Methidathion	mg/kg	0.5	<0.5	<0.5	0	<0.5			<0.5	<0.5	0	<0.5		
Ronnel	mg/kg	0.1					<0.1						<0.1	
Other														
Estimated Fibres	mg/kg	100	<100			<100								
PAH														
Naphthalene	mg/kg	0.1	<0.1	<0.1	0	<0.1	<0.1	0	<0.1	<0.1	0	<0.1	<0.1	0
1-Methylnaphthalene	mg/kg	0.1	<0.1	<0.1	0	<0.1			<0.1	<0.1	0	<0.1		
2-methylnaphthalene	mg/kg	0.1	<0.1	<0.1	0	<0.1			<0.1	<0.1	0	<0.1		
Acenaphthene	mg/kg	0.1	<0.1	<0.1	0	<0.1	<0.1	0	<0.1	<0.1	0	<0.1	<0.1	0
Acenaphthylene	mg/kg	0.1	<0.1	<0.1	0	<0.1	<0.1	0	<0.1	<0.1	0	<0.1	<0.1	0
Anthracene	mg/kg	0.1	<0.1	<0.1	0	<0.1	<0.1	0	<0.1	<0.1	0	<0.1	<0.1	0
Benz(a)anthracene	mg/kg	0.1	<0.1	<0.1	0	<0.1	<0.1	0	<0.1	<0.1	0	<0.1	<0.1	0
Benzo(a) pyrene	mg/kg	0.05	<0.1	<0.1	0	<0.1	<0.05	0	<0.1	<0.1	0	<0.1	**0.06**	nc
Benzo(a)pyrene TEQ (LOR)	mg/kg	0.3	<0.3	<0.3	0	<0.3	<0.5	0	<0.3	<0.3	0	<0.3	<0.5	0
Benzo(a)pyrene TEQ calc (Half)	mg/kg	0.2	<0.2	<0.2	0	<0.2	<0.5	0	<0.2	<0.2	0	<0.2	<0.5	0
Benzo(a)pyrene TEQ calc (Zero)	mg/kg	0.2	<0.2	<0.2	0	<0.2	<0.5	0	<0.2	<0.2	0	<0.2	<0.5	0
Benzo(b+j)fluoranthene	mg/kg	0.1	<0.1	<0.1	0	<0.1			<0.1	<0.1	0	<0.1		
Benzo(b+j+k)fluoranthene	mg/kg	0.2					<0.2						<0.2	
Benzo(g,h,i)perylene	mg/kg	0.1	<0.1	<0.1	0	<0.1	<0.1	0	<0.1	<0.1	0	<0.1	<0.1	0
Benzo(k)fluoranthene	mg/kg	0.1	<0.1	<0.1	0	<0.1			<0.1	<0.1	0	<0.1		
Chrysene	mg/kg	0.1	<0.1	<0.1	0	<0.1	<0.1	0	<0.1	<0.1	0	<0.1	<0.1	0
Dibenz(a,h)anthracene	mg/kg	0.1	<0.1	<0.1	0	<0.1	<0.1	0	<0.1	<0.1	0	<0.1	<0.1	0
Fluoranthene	mg/kg	0.1	<0.1	<0.1	0	<0.1	<0.1	0	**0.2**	**0.2**	0	**0.2**	**0.1**	**67**
Fluorene	mg/kg	0.1	<0.1	<0.1	0	<0.1	<0.1	0	<0.1	<0.1	0	<0.1	<0.1	0
Indeno(1,2,3-c,d)pyrene	mg/kg	0.1	<0.1	<0.1	0	<0.1	<0.1	0	<0.1	<0.1	0	<0.1	<0.1	0
PAHs (Sum of positives)	mg/kg	0.05	<0.8	<0.8	0	<0.8	<0.05	0	<0.8	<0.8	0	<0.8	**0.3**	nc
PAHs (Sum of total)	mg/kg	0.8	<0.8	<0.8	0	<0.8			<0.8	<0.8	0	<0.8		
Phenanthrene	mg/kg	0.1	<0.1	<0.1	0	<0.1	<0.1	0	<0.1	<0.1	0	<0.1	<0.1	0
Pyrene	mg/kg	0.1	<0.1	<0.1	0	<0.1	<0.1	0	**0.2**	**0.2**	0	**0.2**	**0.1**	**67**
PCBs														
Arochlor 1016	mg/kg	0.1	<0.2	<0.2	0	<0.2			<0.2	<0.2	0	<0.2	<0.1	0
Arochlor 1221	mg/kg	0.1	<0.2	<0.2	0	<0.2			<0.2	<0.2	0	<0.2	<0.1	0
Arochlor 1232	mg/kg	0.1	<0.2	<0.2	0	<0.2			<0.2	<0.2	0	<0.2	<0.1	0
Arochlor 1242	mg/kg	0.1	<0.2	<0.2	0	<0.2			<0.2	<0.2	0	<0.2	<0.1	0
Arochlor 1248	mg/kg	0.1	<0.2	<0.2	0	<0.2			<0.2	<0.2	0	<0.2	<0.1	0
Arochlor 1254	mg/kg	0.1	**1.5**	**1.0**	**40**	**1.5**			<0.2	<0.2	0	<0.2	<0.1	0
Arochlor 1260	mg/kg	0.1	<0.2	<0.2	0	<0.2			<0.2	<0.2	0	<0.2	<0.1	0
Arochlor 1268	mg/kg	0.2	<0.2	<0.2	0	<0.2			<0.2	<0.2	0	<0.2		
Aroclor 1262	mg/kg	0.2	<0.2	<0.2	0	<0.2			<0.2	<0.2	0	<0.2		
PCBs (Sum of total)	mg/kg	0.1	**2**	<1	nc	**2**	**1.8**	11	<1	<1	0	<1	<0.1	0
Pesticides														
Isodrin	mg/kg	0.1	<0.1	<0.1	0	<0.1			<0.1	<0.1	0	<0.1		
Mirex	mg/kg	0.1	<0.1	<0.1	0	<0.1			<0.1	<0.1	0	<0.1		
Parathion	mg/kg	0.1	<0.2	<0.2	0	<0.2	<0.1	0	<0.2	<0.2	0	<0.2	<0.1	0

RPD Control Limits
Pass - RPD <= 30%
nc = not calculated, result(s) below LOR
Exceeds RPD Control Limits

Annexure G

Material assessment report

Document Ref: 10903_EAR_MA_20190506

Dan Condon
EMM Consulting
187 Coventry Street
South Melbourne
Victoria 3205

Via email: dcondon@emmconsulting.com.au

Dear Dan,

Re: 10903 - Material assessment (MA) of the unexpected finds of potential asbestos fragments on the soil surface of the Polo Flat Airport, Polo Flat, NSW 2630 (Lot 14 DP250029) – 16 April 2019.

SITE WORK

Andrew Roberts who is an ACT licenced asbestos assessor (recognised by NSW Worksafe) from Robson Environmental Pty Ltd (Robson) undertook and systematic walkover and visual inspection of clusters of suspected asbestos containing materials (ACM) fragments on the soil surface located at the Polo Flat Airport, Polo Flat, NSW, 2620 (Lot 14 DP250029) as shown in **Figure 1** and **Figure 2**. Photographs of the suspect fragments on the soil surface are shown in **Appendix A**. The risk ratings for ACM and the assessment results for the sampled materials are presented in **Table 1** and **Table 2** respectively**.**

RISK ASSESSMENT

A Risk Assessment (RA) was undertaken on all sampled asbestos containing materials (ACM) to enable informed decisions to be made concerning the management of ACM as per the '*How to Manage and Control Asbestos in the Workplace Code of Practice'.* This Risk Assessment takes into account:

- The type of ACM (non-friable or friable);
- The condition and location of the ACM;
- Whether the ACM is likely to be disturbed due to its condition and location;
- The likelihood of exposure to asbestos fibre.

MATERIAL ASSESSMENT RESTRICTIONS AND CAVEATS

Robson has taken care to ensure that this report includes the most accurate information available. This report does not constitute a full register of asbestos containing materials at the above site as required by State Legislation and the Codes of Practice. The material assessments, recommendations and/or conclusions contained in this report must not be used to excuse a person of their responsibility to work in accordance with relevant Statutory Requirements, Codes of Practice, Guidelines, Safety Data Sheets, Work Instructions or reasonable work practices.

Table 1 details the ratings for the condition and associated risk of each positively identified asbestos material at the time of the assessment. The ratings for each item are presented in **Table 2** within the analytical results.

Table 1: ACM Condition & Risk Ratings

ACM CONDITION RATING		
1	Severe	Material in very poor condition
2	Poor	Deteriorated material and considerable damage
3	Fair	Minor damage or signs of weathering
4	Good	Well sealed stable material
ACM RISK RATING		
A	Very High	Exposure to airborne asbestos likely as a consequence of minor disturbance
B	High	Exposure to airborne asbestos possible as a consequence of minor disturbance
C	Medium	Exposure to airborne asbestos unlikely during normal building use
D	Low	Negligible exposure to airborne asbestos during normal building use

NON-FRIABLE ACM

Non-friable ACM is any material that contains asbestos firmly bound into a matrix. It may consist of cement or various resins/binders and cannot be reduced to a dust by hand pressure. As such it does not present an exposure hazard unless cut, abraded, sanded or otherwise disturbed. Therefore, the exposure risk from non-friable ACM is negligible during normal building occupation.

FRIABLE ACM

Friable asbestos material can be crumbled or reduced to a dust by hand pressure when dry. It can represent a significant exposure hazard as a consequence of minor disturbance. Examples of friable asbestos are hot water pipe lagging, severely damaged asbestos cement sheet, limpet spray to structural beams and electrical duct heater millboard.

LABORATORY METHODOLOGY

Sampled material was double bagged and transported to the Robson's National Association of Testing Authorities (NATA) accredited laboratory. Samples were delivered with a Chain of Custody (COC) form written by the ACT licensed Asbestos Assessor which would be signed off on receipt by the laboratory. The received materials were analysed for asbestos fibre content which is determined by Polarised Light Microscopy with dispersion staining techniques.

The sample taken from the suspected ACM was representative of the materials sampled, individually identified, transported, analysed and reported in accordance with the relevant Statutory Regulations, Codes of Practice and Robson Environmental In-house Procedures 2 & 3.

All inspections, sampling, identification and reporting was undertaken in accordance with Robsons NATA, ISO9001, ISO14001 and AS4801 accreditations.

Table 2: Sample Analysis Results

Sample Number	Location description	Material	Type	Risk Rating	Fibrous Content
B1400 (16 April 2019)	North west section of Polo Flats Airport site - Fragments of sheet on soil surface	Sheet Debris	Non-Friable	2B	Amosite, Chrysotile, Asbestos Detected
B1401 (16 April 2019)	Central west section of Polo Flats Airport site - Fragments of sheet on soil surface	Sheet Debris	Non-Friable	2B	Amosite, Chrysotile, Asbestos Detected
B1402 (16 April 2019)	Central west section of Polo Flats Airport site - Fragments of sheet on soil surface	Sheet Debris	Non-Friable	2B	Amosite, Chrysotile, Crocidolite Asbestos Detected
B1418 (16 April 2019)	North section of Polo Flats Airport site - Fragments of sheet on soil surface	Sheet Debris	Non-Friable	2B	Amosite, Chrysotile Asbestos Detected
B1451 (16 April 2019)	Central west section of Polo Flats Airport site - Fragments of sheet on soil surface	Sheet Debris	Non-Friable	2B	Amosite, Chrysotile Asbestos Detected
B1494 (16 April 2019)	Central west section of Polo Flats Airport site - Fragments of sheet on soil surface	Sheet Debris	Non-Friable	2B	Amosite, Chrysotile Asbestos Detected
B1495 (16 April 2019)	Central west section of Polo Flats Airport site - Fragments of sheet on soil surface	Sheet Debris	Non-Friable	2B	Amosite, Chrysotile Asbestos Detected
B1496 (16 April 2019)	South section of Polo Flats Airport site - Fragments of sheet on soil surface	Sheet Debris	Non-Friable	2B	Amosite, Chrysotile Asbestos Detected
B1497 (16 April 2019)	South central section of Polo Flats Airport site - Fragments of sheet on soil surface	Sheet Debris	Non-Friable	2B	Amosite, Chrysotile Asbestos Detected
B1498 (16 April 2019)	South section of Polo Flats Airport site - Fragments of sheet on soil surface	Sheet Debris	Non-Friable	2B	Amosite, Chrysotile Asbestos Detected
B1499 (16 April 2019)	South section of Polo Flats Airport site - Fragments of pipe on soil surface	Pipe	Non-Friable	2B	Amosite, Chrysotile Asbestos Detected

Asbestos containing material
Presumed asbestos containing material
Non- asbestos containing material

DISCUSSION

Andrew Roberts who is an ACT licenced asbestos assessor (recognised by NSW Worksafe) as well as a suitability qualified environmental consultant (SQEC) from Robson undertook a systematic walkover of the Polo Flat Airport site with a SQEC from EMM Consulting. During the walkover scattered clusters of ACM fragments were observed in 19 separate locations across the site, of which 11 of the locations were sampled and subsequently analysed. One (1) representative sample from each of the 11 clusters on the soil surface of the site were collected and submitted for analysis at the Robson NATA accredited laboratory.

All 11 samples tested positive for asbestos as shown in **Appendix B** and in **Table 2**. The other eight (8) observed locations were recorded but not sampled as they were similar to the other sampled locations. The locations of the observed and sampled locations are shown in **Figure 2** attached.

The site observations indicated that the ACM observed onsite were not associated with any fill material or any other obvious contaminating source but appeared to be scattered on the surface of the soil onsite. However there is still a potential for ACM to be present below the surface of the site in isolated pockets of fill material.

RECOMMEDNATIONS

Robson recommends that an NSW licensed asbestos removalist be engaged to remove all visible surface ACM from the site as asbestos waste. Any soil or rubble material (i.e. bricks, concrete and other waste) mixed with ACM will also have to be removed and disposed offsite as asbestos waste.

However due to the potential risk that subsurface ACM fragments may be present in soil a construction environmental management plan (CEMP) with an unexpected find protocol (UFP) should be prepared prior to excavations and construction works to provide guidance for the appropriate management of unexpected finds in soil on the site.

In general if any potential ACM is observed onsite works should be stopped in the area of the find, the area cordoned off with asbestos signed barrier tape to ensure access was restricted and a NSW licenced asbestos assessor contacted for advice.

ASBESTOS REMOVAL

Removal of ACM and ACM impacted soil/fill material as asbestos waste must be undertaken by an NSW licenced asbestos removalist as per the '*How to Safely Remove Asbestos Code of Practice*'. Removal of non-friable asbestos and ACM impacted soils/fill material may be undertaken by either an NSW licenced Class A or B asbestos removalist.

The NSW licenced asbestos removalist must notify WorkSafe NSW at least (5 days) prior to any non-friable asbestos removal works commencing. The ACT licenced asbestos removalist must supply an Asbestos Removal Control Plan (ARCP) and a Safe Work Method Statement (SWMS) before commencement of removal works. An independent NSW licenced asbestos assessor should be engaged to ensure that the ARCP addresses all safety issues relating to the planned asbestos removal works.

Large volume of ACM impacted soil/fill material and/or if the impacted soil that cannot be removed with asbestos bags the soil must only be transported in a covered leak proof vehicles or skip bins.

Airborne fibre monitoring sampling should be undertaken in accordance with the '*Guidance Note on the Membrane Filter Method for Estimating Airborne Asbestos Fibres, 2nd* Edition' and test certificates should be NATA endorsed.

An independent NSW licenced asbestos assessor must also be employed to undertake a final clearance inspection of the asbestos removal area. A satisfactory clearance certificate for the removal area must ensure that no visible ACM fragments or presumed ACM fragments or impacted soil/fill material remains on the surface of the removal area.

For and on behalf of Robson Environmental Pty Ltd

Regards,

Andrew Roberts
Senior Environmental Scientist BApp Sc (EnvSc)
Asbestos Assessor (WorkSafe ACT) License No: AA00015 (Recognised by NSW Worksafe)

Attachments

Attachment A: Photographs

Attachment B: Laboratory Results

Figures

ATTACHMENT A - PHOTOGRAPHS

SAMPLE NO	LOCATION DESCRIPTION	MATERIAL	PHOTOGRAPH
B1400	Northwest section of Polo Flats Airport site - Fragments of sheet on soil surface	Sheet Debris	
B1401	Central west section of Polo Flats Airport site - Fragments of sheet on soil surface	Sheet Debris	
B1402	Central west section of Polo Flats Airport site - Fragments of sheet on soil surface	Sheet Debris	

SAMPLE NO	LOCATION DESCRIPTION	MATERIAL	PHOTOGRAPH
B1418	North section of Polo Flats Airport site - Fragments of sheet on soil surface	Sheet Debris	
B1451	Central west section of Polo Flats Airport site - Fragments of sheet on soil surface	Sheet Debris	
B1494	Central west section of Polo Flats Airport site - Fragments of sheet on soil surface	Sheet Debris	

SAMPLE NO	LOCATION DESCRIPTION	MATERIAL	PHOTOGRAPH
B1495	Central west section of Polo Flats Airport site - Fragments of sheet on soil surface	Sheet Debris	
B1496	South section of Polo Flats Airport site - Fragments of sheet on soil surface	Sheet Debris	
B1497	South central section of Polo Flats Airport site - Fragments of sheet on soil surface	Sheet Debris	

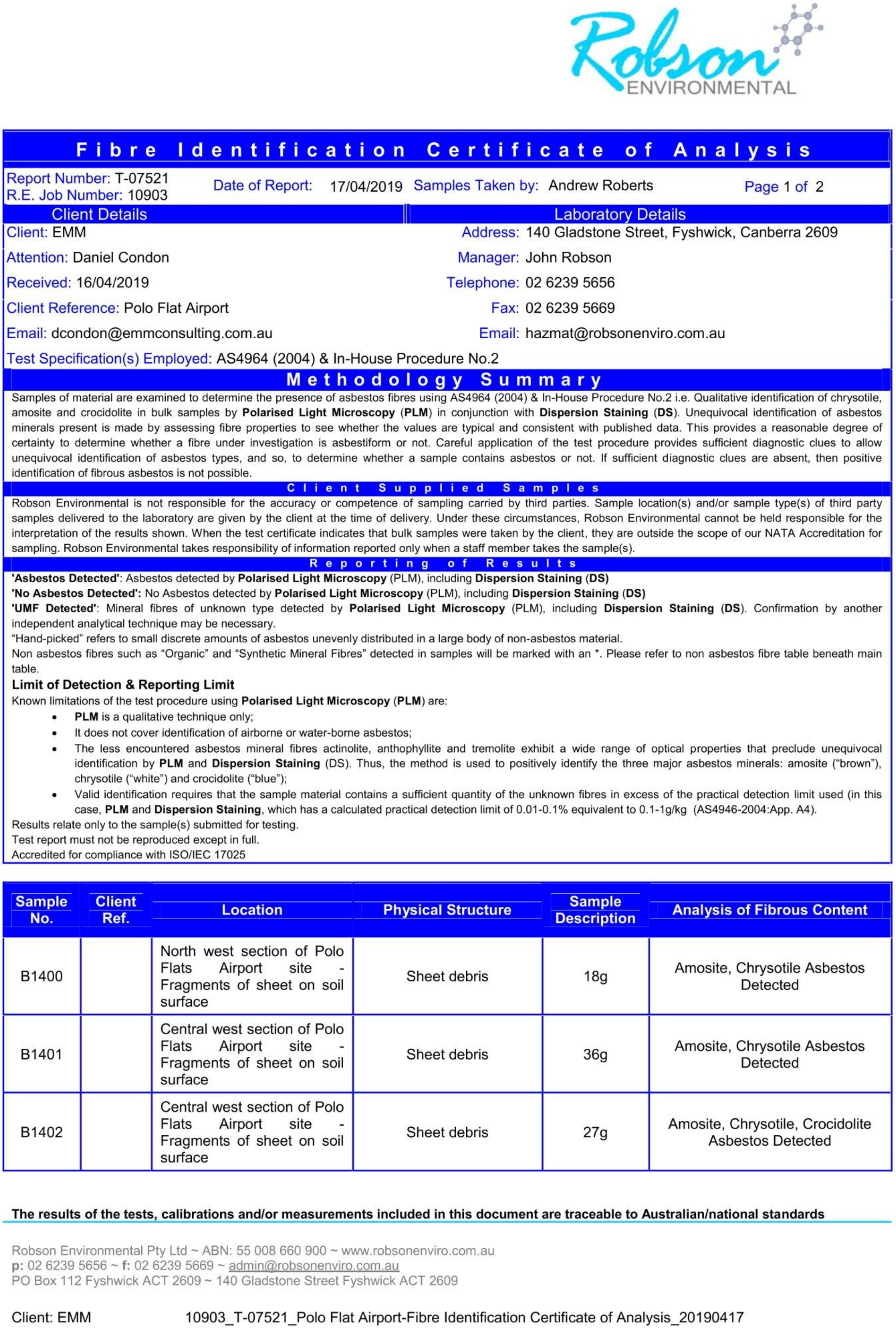
SAMPLE NO	LOCATION DESCRIPTION	MATERIAL	PHOTOGRAPH
B1498	South section of Polo Flats Airport site - Fragments of sheet on soil surface	Sheet Debris	
B1499	South section of Polo Flats Airport site - Fragments of pipe on soil surface	Pipe	
Location (L1)	Sheet fragments observed on soil surface	-	

SAMPLE NO	LOCATION DESCRIPTION	MATERIAL	PHOTOGRAPH
Location (L2)	Sheet fragments observed on soil surface	-	
Location (L3)	Sheet fragments observed in rubble material	-	
Location (L4)	Sheet fragments observed on soil surface	-	

SAMPLE NO	LOCATION DESCRIPTION	MATERIAL	PHOTOGRAPH
Location (L5)	Sheet fragments observed on soil surface	-	
Location (L6)	Sheet fragments observed on soil surface	-	
Location (L7)	Sheet fragments observed on soil surface	-	

SAMPLE NO	LOCATION DESCRIPTION	MATERIAL	PHOTOGRAPH
Location (L8)	Pipe fragments observed on soil surface	-	

ATTACHMENT B – LABORATORY RESULTS



Fibre Identification Certificate of Analysis

Report Number: T-07521 R.E. Job Number: 10903	Date of Report: 17/04/2019	Samples Taken by: Andrew Roberts	Page 1 of 2

Client Details

Client: EMM
Attention: Daniel Condon
Received: 16/04/2019
Client Reference: Polo Flat Airport
Email: dcondon@emmconsulting.com.au

Laboratory Details

Address: 140 Gladstone Street, Fyshwick, Canberra 2609
Manager: John Robson
Telephone: 02 6239 5656
Fax: 02 6239 5669
Email: hazmat@robsonenviro.com.au

Test Specification(s) Employed: AS4964 (2004) & In-House Procedure No.2

Methodology Summary

Samples of material are examined to determine the presence of asbestos fibres using AS4964 (2004) & In-House Procedure No.2 i.e. Qualitative identification of chrysotile, amosite and crocidolite in bulk samples by **Polarised Light Microscopy** (**PLM**) in conjunction with **Dispersion Staining** (**DS**). Unequivocal identification of asbestos minerals present is made by assessing fibre properties to see whether the values are typical and consistent with published data. This provides a reasonable degree of certainty to determine whether a fibre under investigation is asbestiform or not. Careful application of the test procedure provides sufficient diagnostic clues to allow unequivocal identification of asbestos types, and so, to determine whether a sample contains asbestos or not. If sufficient diagnostic clues are absent, then positive identification of fibrous asbestos is not possible.

Client Supplied Samples

Robson Environmental is not responsible for the accuracy or competence of sampling carried by third parties. Sample location(s) and/or sample type(s) of third party samples delivered to the laboratory are given by the client at the time of delivery. Under these circumstances, Robson Environmental cannot be held responsible for the interpretation of the results shown. When the test certificate indicates that bulk samples were taken by the client, they are outside the scope of our NATA Accreditation for sampling. Robson Environmental takes responsibility of information reported only when a staff member takes the sample(s).

Reporting of Results

'Asbestos Detected': Asbestos detected by **Polarised Light Microscopy** (PLM), including **Dispersion Staining** (**DS**)
'No Asbestos Detected': No Asbestos detected by **Polarised Light Microscopy** (PLM), including **Dispersion Staining** (**DS**)
'UMF Detected': Mineral fibres of unknown type detected by **Polarised Light Microscopy** (PLM), including **Dispersion Staining** (**DS**). Confirmation by another independent analytical technique may be necessary.
"Hand-picked" refers to small discrete amounts of asbestos unevenly distributed in a large body of non-asbestos material.
Non asbestos fibres such as "Organic" and "Synthetic Mineral Fibres" detected in samples will be marked with an *. Please refer to non asbestos fibre table beneath main table.

Limit of Detection & Reporting Limit

Known limitations of the test procedure using **Polarised Light Microscopy** (**PLM**) are:

- **PLM** is a qualitative technique only;
- It does not cover identification of airborne or water-borne asbestos;
- The less encountered asbestos mineral fibres actinolite, anthophyllite and tremolite exhibit a wide range of optical properties that preclude unequivocal identification by **PLM** and **Dispersion Staining** (DS). Thus, the method is used to positively identify the three major asbestos minerals: amosite ("brown"), chrysotile ("white") and crocidolite ("blue");
- Valid identification requires that the sample material contains a sufficient quantity of the unknown fibres in excess of the practical detection limit used (in this case, **PLM** and **Dispersion Staining**, which has a calculated practical detection limit of 0.01-0.1% equivalent to 0.1-1g/kg (AS4946-2004:App. A4).

Results relate only to the sample(s) submitted for testing.
Test report must not be reproduced except in full.
Accredited for compliance with ISO/IEC 17025

Sample No.	Client Ref.	Location	Physical Structure	Sample Description	Analysis of Fibrous Content
B1400		North west section of Polo Flats Airport site - Fragments of sheet on soil surface	Sheet debris	18g	Amosite, Chrysotile Asbestos Detected
B1401		Central west section of Polo Flats Airport site - Fragments of sheet on soil surface	Sheet debris	36g	Amosite, Chrysotile Asbestos Detected
B1402		Central west section of Polo Flats Airport site - Fragments of sheet on soil surface	Sheet debris	27g	Amosite, Chrysotile, Crocidolite Asbestos Detected

The results of the tests, calibrations and/or measurements included in this document are traceable to Australian/national standards

Robson Environmental Pty Ltd ~ ABN: 55 008 660 900 ~ www.robsonenviro.com.au
p: 02 6239 5656 ~ **f:** 02 6239 5669 ~ admin@robsonenviro.com.au
PO Box 112 Fyshwick ACT 2609 ~ 140 Gladstone Street Fyshwick ACT 2609

Client: EMM 10903_T-07521_Polo Flat Airport-Fibre Identification Certificate of Analysis_20190417

Fibre Identification Certificate of Analysis

Laboratory Report Number: 10903_T-07521 **Analyst:** Natasha Pearson **Page** 2 of 2

Sample No.	Client Ref.	Location	Physical Structure	Sample Description	Analysis of Fibrous Content
B1418		North section of Polo Flats Airport site - Fragments of sheet on soil surface	Sheet debris	63g	Amosite, Chrysotile Asbestos Detected
B1451		Central west section of Polo Flats Airport site - Fragments of sheet on soil surface	Sheet debris	56g	Amosite, Chrysotile Asbestos Detected
B1494		Central west section of Polo Flats Airport site - Fragments of sheet on soil surface	Sheet debris	25g	Amosite, Chrysotile Asbestos Detected
B1495		Central west section of Polo Flats Airport site - Fragments of sheet on soil surface	Sheet debris	26g	Amosite, Chrysotile Asbestos Detected
B1496		South section of Polo Flats Airport site - Fragments of sheet on soil surface	Sheet debris	27g	Amosite, Chrysotile Asbestos Detected
B1497		South central section of Polo Flats Airport site - Fragments of sheet on soil surface	Sheet debris	21g	Amosite, Chrysotile Asbestos Detected
B1498		South section of Polo Flats Airport site - Fragments of sheet on soil surface	Sheet debris	9g	Amosite, Chrysotile Asbestos Detected
B1499		SOuth section of Polo Flats Airport site - Fragments of pipe on soil surface	Pipe	5g	Amosite, Chrysotile Asbestos Detected

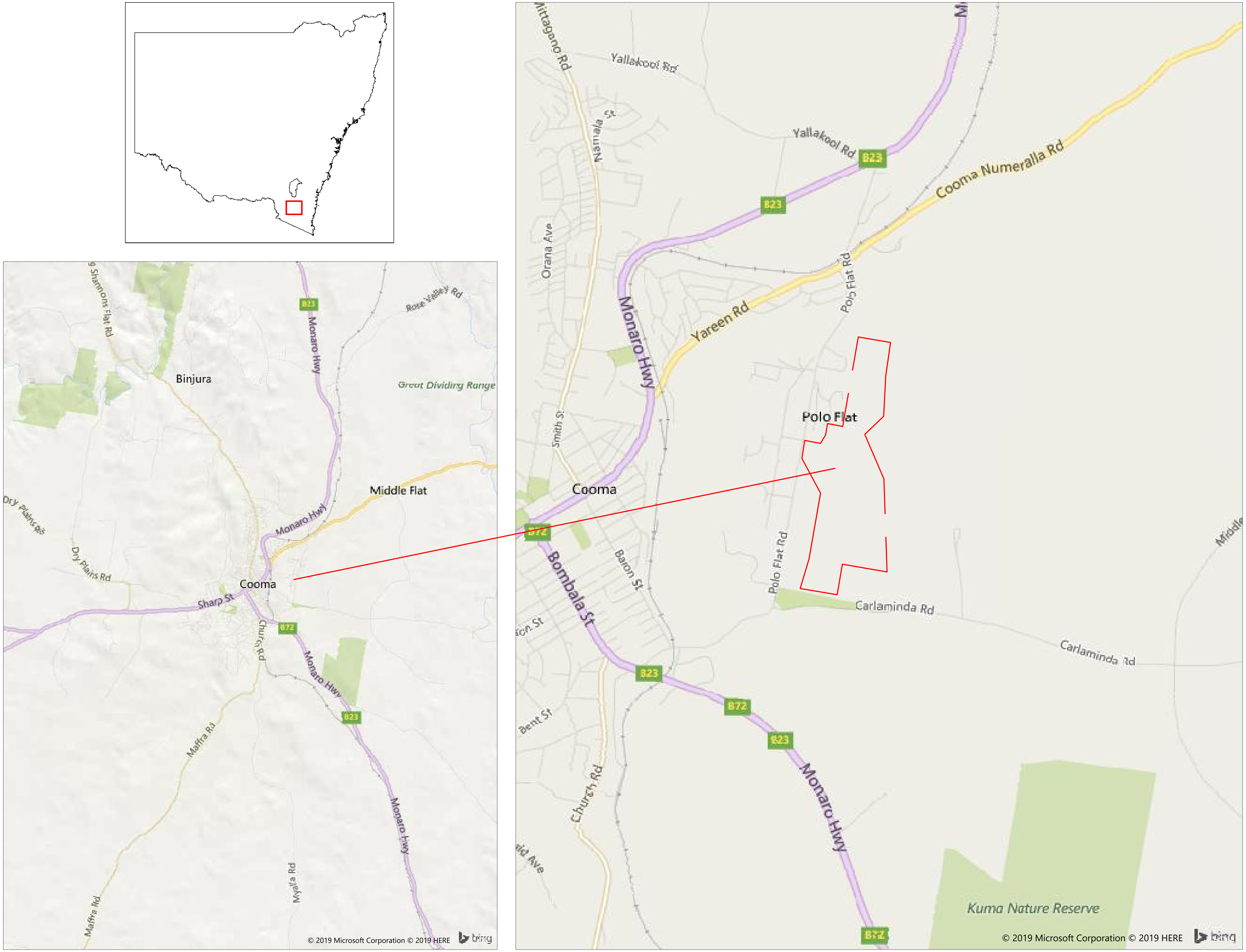
Robson Approved Identifier
Natasha Pearson

NATA
No. 3181
Accredited for compliance with ISO/IEC 17025 - Testing

Robson Approved Signatory
Natasha Pearson

The results of the tests, calibrations and/or measurements included in this document are traceable to Australian/national standards

FIGURES



LEGEND

⬚ SITE BOUNDARY

NOTES

Scale, locations, and boundaries are approximate only.

Robson ENVIRONMENTAL

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ABN: 55 008 660 900

CLIENT: EMM CONSULTING PTY LTD

SITE: POLO FLATS AIRPORT
LOT 14 DP250029
POLO FLAT NSW

PROJECT: MATERIAL ASSESSMENT FOR SITE INSPECTION

TITLE: SITE LOCATION PLAN

SCALE (m): 0 15 30

REF: MICROSOFT 2018
HERE 2018

DRAWN: AR

CHECKED: BK

FIGURE: 1

PROJECT: 10903

DATE: 06.05.2019

REV: A

LEGEND

🟦 BLOCK BOUNDARY

🟥 SITE BOUNDARY

⊞ SAMPLE LOCATIONS

⊗ VISUALLY OBSERVED LOCATIONS

NOTES

Scale, locations, and boundaries are approximate only.

KEY PLAN - INSET

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ABN: 55 008 660 900

CLIENT: EMM CONSULTING PTY LTD

SITE:
POLO FLATS AIRPORT
LOT 14 DP250029
POLO FLAT NSW

PROJECT: MATERIAL ASSESSMENT FOR SITE INSPECTION

TITLE: SAMPLE LOCATION PLAN (16/04/2019)

SCALE (m): 0 100 200

REF: NEARMAP 2018

DRAWN: AR

CHECKED: BK

FIGURE: 2

PROJECT: 10903

DATE: 06.05.2019

REV: A

Annexure H

Hazardous materials audit report

Hazardous Materials Survey & Management Plan

Polo Flat Airport
63 Polo Flat Rd
Polo Flat
NSW
2630

April 2019

This report MUST NOT be used as a removal specification

Client: EMM,

187 Coventry Street Melbourne, 3205

Accredited for compliance with ISO/IEC 17020

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PO Box 112 Fyshwick ACT 2609 ~ 140 Gladstone Street Fyshwick ACT 2609

CERTIFICATE OF APPROVAL FOR ISSUE OF DOCUMENTS

Document No: 10903
Title: Hazardous Materials Survey
Polo Flat Airport
63 Polo Flat Rd
Polo Flat
NSW
2630

Revision Status: 1
Date of Issue: 30/04/2019

Client: EMM

Copy No: One

	Assessor	Position	Signature
Surveyed by:	Joshua Low - Licensed Asbestos Assessor #NTWS-AA-466882 Simon Saville - Licensed Asbestos Assessor #AA00016	Manager Hazardous Materials & Laboratory Services Hazardous Materials Consultant	
Approved by:	Anne Robson - Licensed Asbestos Assessor #AA00022	Director	
Released by:	John Robson - Licensed Asbestos Assessor #LAA000195	Managing Director	

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Confidential

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Organisation	Attention	Copy No.	Actioned
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Robson Environmental Pty Ltd	John Robson	2	30/04/2019

TABLE OF CONTENTS

1 PREFACE

This Hazardous Materials Survey and Management Plan (HMSMP) was commissioned by EMM in order to assure the occupants of the site the highest standards of occupational health and safety in relation to hazardous materials. The safe removal of hazardous materials must be undertaken by appropriately licensed and skilled personnel prior to the demolition of the premises.

The HMSMP contains sections covering the identification, evaluation and control of hazardous materials including asbestos containing materials (ACM), Lead Paint, Polychlorinated Biphenyls (PCB), Synthetic Mineral Fibre (SMF), Ozone Depleting Substances (ODS) and fuel storage above and underground storage tanks (A/UST).

Robson Environmental Pty Ltd commenced the hazardous material survey on 17 April 2019. The information contained in this document will assist the PMCW (person with control or management of a workplace) in fulfilling their obligations under the latest editions of the following regulations/Acts:

- *How To Manage and Control Asbestos In The Workplace Code of Practice*
- *How To Safely Remove Asbestos Code of Practice*
- *Dangerous Substances (General) Regulation 2004*
- *Dangerous Substances Act 2004*
- *Work Health and Safety Act 2011*
- *Work Health and Safety Regulations 2011*
- *National Code of Practice for the Safe Use of Synthetic Mineral Fibre* [NOHSC:2006(1990)]
- *National Standard for Synthetic Mineral Fibres* [NOHSC:1004(1990)]
- *Guide to Hazardous Paint Management Part 2: Lead paint in residential, public and commercial buildings Standards Australia, AS 4361.2 – 2017*
- *Identification of PCB-Containing Capacitors; An information Booklet for Electricians and Electrical Contractors* ANZECC 1997 and
- *The Australian Refrigeration and Air-conditioning Code of Good Practice* Standards Australia, HB 40.1 – 2001

2 EXECUTIVE SUMMARY

2.1 Purpose

This report presents the findings of a Hazardous Materials survey conducted at the site on 17 April 2019 at the request of the client. The survey was undertaken to assess the extent and condition of hazardous materials and document safe management procedures in accordance with current legislation. The safe removal of hazardous materials must be undertaken by appropriately licensed and skilled personnel prior to refurbishment or demolition of the premises or where the risk assessment recommends removal. This report includes information which must be known and acted upon prior to the commencement of any demolition, refurbishment, or hazardous material removal or remediation. It also details responsibilities that the PMCW (person with management or control of a workplace) and occupier must address to ensure safe occupation of the premises.

2.2 Scope

The Hazardous Materials survey was non-destructive and non-intrusive in nature with the extent limited to the following areas:

- Interior and exterior of the building
- Roof, amenities and immediate surrounding land
- A/UST filler points and breather vents

The survey did not include the inspection or assessment of the following areas:

- Subterranean areas (e.g. infill/soil)
- Concealed cavities
- Formwork and subterranean electrical cable ducts and water pipe ducts

2.3 Survey Methodology

The survey involved the visual inspection of accessible, representative, construction materials and the collection and analysis of sampled materials suspected of being potentially hazardous to human health.

Hazardous materials assessed included ACM, SMF, PCBs, lead containing paint, ODS and A/UST.

The site inspection included the sampling of representative materials suspected of being hazardous, was undertaken in accordance with Robson's NATA ISO/IEC 17020 accreditation, ISO9001, ISO14001, AS4801 and current legislation. The particular sampling methodology used for each hazardous materials type is provided below:

Asbestos: The asbestos materials survey was conducted in accordance with the current legislation. It involved a visual inspection of accessible representative construction materials suspected of containing asbestos. Materials were not sampled from all areas due to the uniformity of the materials used throughout the building(s). Samples were analysed in Robson Environmental's National Association of Testing Authorities (NATA) accredited laboratory for the presence of asbestos by polarising light microscopy and dispersion staining.

Note that electrical switchboards and other similar areas were only inspected where they were isolated by a qualified electrician. Live switchboards were not inspected, and accordingly are presumed to be ACM until conclusively proven otherwise.

Lead (Pb) Based Paints: Paint was tested during the hazardous materials survey using 3M™ LeadCheck™ Swabs which have a detection limit of 0.06% w/w lead, sufficient to classify paint as lead free under AS4361.2-2017. Where requested by the client, deemed prudent by the assessor, or required due to inconclusive results from this test, representative paint samples were also collected in accordance with AS4361.2-2017 and analysed for lead content. In general however as the detection limit of 0.06% w/w lead is only slightly lower than the threshold for lead paint of 0.10% lead set out in AS4361.2-2017 it is generally satisfactory to treat a positive result with 3M™ LeadCheck™ Swabs as being indicative of lead paint, obviating the need for further sampling and analysis.

The sampling criterion provided below is taken from AS4361.2-2017 Section A4 Sampling Strategy clauses (a, b, c);

(a) An adequate number of sample sites should be analysed to properly characterise the paint systems present on site.

(b) For small surfaces such as architraves, windows and doors and cupboards, a **single** sample may suffice.

(c) For large, uniformly painted surface areas such as the exterior facade of high rise buildings, or for interior walls and ceilings of large rooms, and where laboratory testing is employed, **composite** samples should be taken from three separate locations in 10m² sections.

Collected paint samples were analysed for their lead (Pb) content by Envirolab Services Pty Ltd – NATA accreditation number: 2901 using ICP/AES techniques and in-house Method No.4.

Within the same building, wherever a paint coating had a similar surface texture, colour, etc. to a paint coating that had already been sampled because of its suspected lead content, it was presumed that these paint coatings were identical. However, results can only be guaranteed valid for directly tested/sampled paints (especially due to deliberate attempts to match new paint to existing coatings in some applications).

SMF: Synthetic Mineral Fibre (SMF) materials were visually identified and a determination made as to whether they were bonded or un-bonded.

PCBs: The information (make, type, capacitance etc.) recorded for each representative fluorescent light fitting capacitor suspected of containing PCB was cross-referenced against *ANZECC Identification of PCB Containing Capacitors – Information Booklet for Electricians and Electrical Contractors - 1997*.

This identification booklet provides a list of electrical equipment that is known to contain PCBs, and a list of electrical equipment known not to contain PCBs. Where the information recorded from the capacitor case(s) correlated exactly with the information listed in the ANZECC Information Booklet for known PCB-containing capacitors it was determined that PCBs were present in the capacitor under analysis.

Wherever a capacitor could not be identified in either list, this was noted in the PCB register as being a capacitor suspected to contain PCBs.

Note that light fittings were only inspected where they were isolated by a qualified electrician. Live light fittings were not inspected, and accordingly no determination about whether or not they contain PCB is included in this report.

Ozone Depleting Substances: A visual examination was made of refrigerant gas labels affixed to representative air-conditioning and refrigeration units. Information concerning the ASHRAE/ARI refrigerant designated R number was noted for later cross-reference to relevant air-conditioning and refrigeration industry Codes of Practice and Guidelines. In addition, the condition of the plant was noted and comment made as to possible refrigerant or lubricant leaks.

Where refrigerant gas labels were absent from representative air-conditioning and refrigeration plant, an assessment was made as to the likelihood of the plant using an ozone depleting substance based on its age and condition.

Fuel Storage Facilities: The survey included a visual inspection for above ground storage tanks (AST) and underground storage tank (UST) filler points and breather vents.

2.4 Key Findings

Asbestos

Table 1A: ACM locations and required actions

Administration Building		
ACM	**Locations**	**Action to be taken**
Woven product (Presumed Friable)	Ground floor toilets - Insulation to light wiring	Label and maintain Inspect every 5 years

Polo Flat Airport		
ACM	**Locations**	**Action to be taken**
Sheet (Presumed Non-Friable)	Ground floor hangar west end - electrical switchboard backing	Label and maintain Inspect annually

Refer to Section 2.4 - Table 1B for presumed ACM and Section 3.2 for exclusions

Table 1B: Presumed ACM, concealed locations and required actions

Type	ACM	Locations	Action to be taken
The materials listed below while not identified on site, should be presumed to be present until a destructive survey confirms otherwise			
Presumed ACM	Insulation/pipe lagging	Inaccessible ducts, risers and ceiling and wall space cavities	Destructive survey under controlled conditions prior to any refurbishment which is likely to disturb possible ACM in these areas. Until these areas are surveyed they should be presumed to contain asbestos. No access to unauthorised personnel should be given
	Asbestos millboard lining	Interior of air conditioning ductwork adjacent to heater elements	
	Asbestos insulation and gaskets/joints	Within mechanical equipment concealed by outer metal cladding, structure or housing	
	Asbestos vinyl floor tiles, covering, cushioning underlay and adhesive	Found beneath carpets and vinyl flooring	
	Asbestos sheeting	Backing material to ceramic tiles (roofs, floors and walls) and packers to building construction joints, such as gable end verge undercloaking	
	Asbestos cement sheet formwork and electrical cable duct / water pipe	Subterranean areas	

Prior to any planned demolition, refurbishment or maintenance, its effect upon any in situ asbestos must be established by reference to this document including amendments.

Lead Paint

It should be assumed that all similar paints throughout the building contain comparable percentages of lead.

Lead Paint (>0.1%) - Administration Building		
Location	**Paint Colour**	**Required action**
Ground floor throughout - window and door trims	Blue	Inspect every 5 years
Ground floor throughout - internal wall	White	Inspect every 5 years
Ground floor throughout - window and door trims	White	Inspect every 5 years
Exterior throughout- gutters	Green	Encapsulate Inspect every 5 years
Exterior throughout- window and door trims	Blue	Encapsulate Inspect every 5 years
Exterior throughout - walls	Yellow	Encapsulate Inspect every 5 years
Exterior throughout -walls	White	Encapsulate Inspect every 5 years

Lead Paint (>0.1%) - Polo Flat Airport		
Location	**Paint Colour**	**Required action**
Ground floor open hanger - to wall and trims	White	Label and Maintain Maintain
Ground floor open hanger - to structural beams	Yellow	Label and Maintain Maintain

Synthetic Mineral Fibre (SMF)

It should be presumed that SMF materials may be present to inaccessible areas.

Administration Building		
Material	**Location & Material**	**Required action**
Batts	Ground floor office ceiling space	Maintain
Insulation to hot water heater	Ground floor laundry	Maintain

Polychlorinated Biphenyls (PCB)

PCB - Administration Building			
Make - Type	**Location**	**Total**	**Required action**
AEE - FW	Ground floor warehouse and art workshop	10 no	Maintain

Non-PCB - Administration Building			
Make - Type	**Location**	**Total**	**Required action**
RIC - LEIEB	Ground floor office	8 no	No action required

* Note that light fittings were only inspected where they were isolated by a qualified electrician. Live light fittings were not inspected, and accordingly no determination about whether or not they contain PCB is included in this report.

Ozone Depleting Substances (ODS)

ODS - Administration Building			
R Number	**Location**	**Total**	**Required action**
R-22	Ground floor offices, AC wall unit	2 no	Maintain

Non – Ozone Depleting Substances

R Number	Location	Total	Required action
No non-ozone depleting substances located			

Above Ground Storage Tanks (AST) & Underground Storage Tanks (UST)

Polo Flat Airport			
A/UST	**Location**	**Total**	**Required action**
No storage tanks located			

*Note that there are approximately 10 fuel drums stored at the south end of the open hangar. These fuel drums should be removed in accordance with the requirements of Safework NSW and the relevant local authority.

2.5 Key Recommendations

Asbestos

- The insulation material to the wiring of the oyster light is presumed to contain asbestos. Due to the live electrical status during the survey, this material could not be sampled. As it is well enclosed within the light covering, this material can be left in-situ providing it is left undisturbed, Prior to any replacement or works being conducted to this type of light, the insulation material should be further investigated by a licensed Assessor or a licensed Removalist should be engaged to remove this material.

- The electrical backing board located at the south west end of the hangar is presumed to contain asbestos. Due to the live electrical status during the survey, this material could not be sampled. The electrical backing board is in good condition and may be left in-situ if left undisturbed and well maintained. Prior to any replacement or works being conducted, this material should be further investigated by a licensed Assessor or a licensed Removalist should be engaged to remove this material.

- ACM must not be drilled, cut, sanded, damaged or abraded and a good paint finish maintained. Asbestos work on non friable ACM may be undertaken by a licensed Class A or B Asbestos Removalist. Any works on, or in the vicinity of friable ACM must only be undertaken by a licensed Class A Asbestos Removalist.

- Any ACM identified in this report that is to remain in situ should be inspected by a licensed Asbestos Assessor at the intervals stated in Section 4.5 Table 3A Asbestos Register.

- As access could not be gained to all areas of the building, it should be presumed that any similar materials located within these areas could contain asbestos until proven otherwise. Strict controls should be put in place to brief all contractors.

- ACM should be labelled with approved asbestos warning labels or signs. Due to the stigma associated with asbestos and to avoid malicious damage to ACM, labelling can be kept to discrete areas. Where labelling cannot be undertaken, the PMCW must adopt strict administrative controls to ensure ACM is not subject to accidental damage.

Asbestos Removal

Removal of ACM must be undertaken by a competent and suitably trained person as per the Code of Practice for the Safe Removal of Asbestos (2011) and the Work Health and Safety Regulation (2011). The removal/remediation of friable ACM must be undertaken by a licensed Class A Asbestos Removalist. Removal or remediation of non friable asbestos may be undertaken by either an A or B Class Asbestos Removalist. A competent person may remove ≤10m² of non friable asbestos and associated Asbestos-Contaminated Dust or Debris (ACD), or ACD not associated with the removal of friable or non friable asbestos where this is only a minor contamination.

Prior to the commencement of any remediation works associated with friable asbestos or >10m² of non friable asbestos, this report and a permit application must be submitted to SafeWork NSW and Comcare (where applicable) at least 5 days prior to removal works commencing. An asbestos removal contractor must supply an Asbestos Removal Control Plan (ARCP) and a Safe Work Method Statement (SWMS) for review by an independent Licensed Asbestos Assessor or competent person, who ensures that the ARCP addresses all safety issues relating to the planned asbestos works.

Air monitoring is mandatory during the removal or remediation of friable asbestos and should be considered during the removal or remediation of non friable asbestos. Air sampling is to be undertaken in accordance with the Guidance Note on the Membrane Filter Method for Estimating Airborne Asbestos Fibres, 2nd Edition [NOHSC: 3003(2005)] and test certificates must be endorsed by a National Association of Testing Authorities (NATA) accredited testing laboratory.

An independent Licensed Asbestos Assessor must be employed to undertake a clearance inspection at the completion of friable asbestos removal or remediation works. Where the removal or remediation of >10m² of non friable asbestos is undertaken a clearance inspection must be undertaken by an independent Asbestos Assessor or competent person. A satisfactory clearance certificate for the remediated areas must state that no visible asbestos or presumed asbestos remains. Additionally no asbestos fibres should be detected by laboratory analysis in any validation samples. All surfaces within the removal or remediation area must be free of general dust, cobwebs and debris.

Lead Paint

- Lead paint is identified throughout the internal and external surfaces of the Administration Building and to the walls, trims and structural beams of the open hangar.
- It is recommended that lead paint be maintained. Any areas that begin to flake, peel or otherwise deteriorate should be appropriately remediated. If the paint is to be removed this should be undertaken by a suitably qualified person.
- It should be assumed that all similar paint applications throughout the building would contain similar percentages of lead.
- Refer to Appendix D for further general information on lead paint.

SMF

- SMF batts are located within the office ceiling space and to the hot water heater within the laundry of the Administration building
- If these materials are to be disturbed during refurbishment appropriate PPE should be worn. SMF materials being removed should be done so using effective dust control procedures.
- Refer to Appendix D for further general information on SMF.

PCBs

- 10 PCB capacitor units within the light fittings were identified in the ground floor warehouse and art workshop of the Administration building.

- Any damaged light fittings containing capacitors with PCBs should be removed and be suitably disposed of in accordance with the NSW regulatory authorities. Refer to Appendix D for the correct handling and disposal of PCB containing capacitors.

- Refer to Appendix D for further general information on PCB.

ODS

- AC wall units within the ground floor offices of the Administration building contain R-22 ODS.

- All refrigeration and air-conditioning plant should be regularly checked and maintained in accordance with the manufacturer guidelines.

- Refer to Appendix D for further general information on ODS.

A/UST

- No above ground or underground storage tanks were identified. However there are approximately 10 fuel drums stored at the south end of the open hangar. Robson Environmental recommends that the fuel drums be removed in accordance with the requirements of SafeWork NSW and the NSW Environmental Protection Authority.

- Refer to Appendix D for further general information on A/UST.

Legislation and Guidelines (UST): In NSW the management of fuel storage tanks is administered by the local Council under the Protection of the Environment Operations (Underground Petroleum Storage Systems) Regulation 2014 (UPSS Regulation) which aims to improve the environmental management of storage systems made under the Act.

Safework NSW is responsible for occupational health and safety issues relating to decommissioning and removal of A/USTs from a site.

For the long-term management of the sites with redundant fuel storage tanks, Robson Environmental Pty Ltd recommends that the USTs be removed in accordance with the requirements of Safework NSW and the relevant local authority. USTs still in use are to be managed in accordance with the requirements of the UPSS Regulation.

Removal of USTs may require approvals from the relevant local authority and should be undertaken in accordance with the UPSS Regulation and Safework NSW Guidelines.

Demolition and Refurbishment

Robson Environmental Pty Ltd recommends that prior to any demolition our office be contacted. Our licensed Asbestos Assessors can attend the site to observe the demolition process, advise as necessary and in the event of previously inaccessible hazardous materials being located, assist with assessing the extent, type and removal or abatement of materials as required.

Robson Environmental Pty Ltd provides a range of occupational hygiene services in relation to the safe remediation or abatement of hazardous materials as well as contaminated land advice in relation to hydrocarbon contamination.

To assist with the tendering process Robson Environmental could be engaged to attend the walkthrough to show the extent of ACM and to respond to questions of clarification.

3 INTRODUCTION

The following Hazardous Materials Survey and Management Plan (HMSMP) has been designed to address the safe control of hazardous materials. It covers current requirements for hazardous material management as at 17/04/2019 only and must therefore be updated to comply with any future changes to legislative requirements. The safe removal of hazardous materials must be undertaken by appropriately licensed and skilled personnel prior to any renovation or demolition of the premises.

This HMSMP includes the following:

- a register of all identified hazardous materials
- extent, form, condition and risks associated with nominated hazardous materials
- labelling requirements for identified hazardous materials
- a timetable for managing risks including priorities for removal or control of ACM and for reviewing risk assessments
- responsibilities of all persons involved in hazardous materials management
- procedures to address incidents or spillage involving ACM
- safe work and removal methods
- guidelines on reviewing and updating the HMSMP and hazardous materials register

3.1 Requirements for the HMSMP

This HMSMP must be held on site for ready access. All personnel undertaking any repair or maintenance work must be provided with a copy of the HMSMP before commencement of work.

Maintenance, trade and other personnel must be instructed not to remove or damage identified hazardous materials if hazardous material is identified in the area where work will be undertaken it must be removed or remediated before work begins.

Removal of hazardous material must be undertaken by suitably qualified persons in accordance with relevant Regulations and Codes of Practice.

3.2 Exclusions

The HMSMP commissioned by the client was to be non-destructive and non-intrusive in nature. This type of commission limits or restricts access to the building structure, some surfaces and materials.

The survey undertaken was limited to those areas available for access at the time of building inspection. Only the areas accessible to the surveyors at the time of the building inspection are included in this HMSMP.

No Access Areas:

- Administration Building, Ground floor toilets

Unless specifically noted, the survey did not cover exterior ground surfaces and sub-surfaces (e.g. infill/soil) or materials other than normal building fabric such as materials in laboratories or special purpose facilities.

At the time of survey no access was gained to materials and / or void areas located behind, above, or attached to any sampled or assumed hazardous materials.

The HMSMP does not include the areas, locations and equipment items to which the surveyors could not gain access at the time of inspection.

Some other areas which *may* conceal asbestos include:

Material	**Location**
Asbestos millboard lining	Air conditioning duct work adjacent to heater elements
Asbestos insulation and gaskets/joints	Within mechanical equipment concealed by outer metal cladding
Asbestos insulation	Walls and cavities (e.g. as lagging to hot water pipes set into and sealed within masonry walls)
Vinyl floor tiles and floor covering	Beneath carpets
Sheeting	Backing material to ceramic tiles and as packers to building construction joints
Asbestos cement sheet formwork and electrical cable/water pipe duct	Sub-ground floor slab

No absolute determination can be made regarding the possibility of concealed or inaccessible hazardous materials or items in the areas, locations and equipment listed in the table above until access is gained to allow for inspection.

Materials and equipment in any non-accessed area should therefore be assumed to contain ACM, SMF, lead paint, PCB, ODS and A/UST (the nominated hazardous materials) and be treated appropriately until assessment and sample analysis confirm otherwise.

Samples were not taken where the act of sampling would endanger the surveyor or affect the structural integrity of the item concerned.

This HMSMP, although extensive, is not intended for and must not be used as a specification or method statement for any future hazardous material removal project. In this instance detailed plans, quantities etc. would be required.

Before any refurbishment or hazardous material removal projects, the contractor(s) carrying out the work must fully acquaint themselves with the extent of the hazardous materials, particularly in those areas which may need full or partial demolition in order to determine the exact extent and location of such materials.

Care should be taken when demolishing or excavating to determine the existence or otherwise of hazardous materials. For example subsurface pipes and drains, revealed through excavation may be constructed of asbestos cement. Wherever a material is uncovered or revealed and it is suspected to be hazardous, it should be assumed to be hazardous and treated appropriately until such time as assessment and sample analysis of the material confirms otherwise.

Until this confirmation occurs the building work must cease in the immediate vicinity of the suspect material and a suitably qualified person must issue a clearance certificate or report before the building work can recommence in the affected area.

To ensure contextual integrity, this HMSMP must always be read in its entirety and should never be referred to in part only.

3.3 Limitations

This report is based on the information obtained by Robson Environmental Pty Ltd at the time of inspection. Robson Environmental Pty Ltd will not update this report; nor take into account any event(s) occurring after the time that its assessment was conducted.

As both the range and use of manufactured products containing hazardous materials was extremely widespread, Robson Environmental Pty Ltd cannot accept responsibility for any consequential loss or damage that results from non-recognition of a material that may later be established to contain hazardous material. For example, certain textured wall and ceiling finishes may contain small traces of asbestos fibre. In situ, textured finishes are often composed of assorted batches of product, or may have been repaired/patched at various times. It is therefore always a possibility that the samples collected may not always be representative of the entire material.

While Robson Environmental Pty Ltd has taken all care and attention to ensure that this report includes the most accurate information available, it has been unable to examine any inaccessible materials or materials hidden from view.

Under normal construction practices some materials are “built in” or “randomly applied”. These materials are therefore not readily accessible and can only be exposed through demolition or damage to the structure or finishes. Access to a material may also be prevented or restricted by “in service” or operational equipment, or where to obtain access contravenes a relevant statutory requirement or code of practice. (e.g. electrical switchboards) Consequently, while all reasonable care and attention was taken in compiling this report no guarantee to its completeness can be given.

Robson Environmental Pty Ltd has taken all care to ensure that this report includes the most accurate information available, where it uses test results prepared by other persons it relies on the accuracy of the test results in preparing this report. In providing this report Robson Environmental Pty Ltd does not warrant the accuracy of such third party test results.

4 ASBESTOS SURVEY RESULTS

4.1 Survey Details

The survey of the site included all accessible areas of the building(s) except where stated otherwise. For further asbestos management information, refer to Appendix D.

4.2 Survey Methodology

The survey involved a visual inspection of the premises and a condition assessment of identified ACM. Samples were analysed in Robson Environmental's National Association of Testing Authorities (NATA) laboratory using polarising light microscopy (PLM) and dispersion staining. Samples were a representative selection of materials suspected of containing asbestos. Samples were not taken from all areas due to the uniformity of the materials used throughout the building. Laboratory analysis certificates are presented in Appendix A.

4.3 Sample Analysis

Table 2: Mineralogical Analysis of Samples for Asbestos using PLM

Administration Building			
Sample reference	**Sample location**	**Sample type**	**Composition Asbestos type**
C2307	Ground floor external - window sills	Putty	No Asbestos Detected
C2308	Ground floor external (south end) - eaves	Cement sheet	No Asbestos Detected
C2309	Ground floor external (north end) - window sills	Putty	No Asbestos Detected
C2310	Ground floor external - north walkway ramp floor	Cement sheet	No Asbestos Detected
C2312	Subfloor - wall panels below deck area	Cement sheet	No Asbestos Detected
C2313	External (southwest) - window sills	Putty	No Asbestos Detected
C2314	Subfloor - packers	Cement sheet	No Asbestos Detected
C2315	Subfloor - ground	Sheet debris	No Asbestos Detected
C2316	Ground floor showers - south wall	Cement sheet	No Asbestos Detected
C2317	Ground floor disabled toilet - south wall	Cement sheet	No Asbestos Detected
C2318	Ground floor laundry - floor	Vinyl floor tile	No Asbestos Detected
C2319	Ground floor workshop- window sills	Mastic	No Asbestos Detected

Administration Building			
Sample reference	**Sample location**	**Sample type**	**Composition Asbestos type**
C2320	Ground floor workshop storage area - internal wall	Cement sheet	No Asbestos Detected
C2321	Ground floor office - ceiling	Soffit board	No Asbestos Detected
C2322	Ground floor kitchen - sink pad	Bituminous pad to underside of sink	No Asbestos Detected
C2330	Ground floor toilet - floor	Vinyl floor covering	No Asbestos Detected
C2331	Ground floor toilet - floor below VFC	Vinyl floor tile	No Asbestos Detected

Hangars			
Sample reference	**Sample location**	**Sample type**	**Composition Asbestos type**
C2323	Ground floor hangar warehouse - west and north walls	Sheet	No Asbestos Detected
C2324	Ground floor hangar store room - cream tiles to floor	Vinyl floor tile	No Asbestos Detected
C2325	Ground floor hangar store room - below cream VFT	Adhesive	No Asbestos Detected
C2326	Ground floor hangar store room - window sealant	Mastic	No Asbestos Detected
C2327	Ground floor central store room - to floor	Vinyl floor covering	No Asbestos Detected
C2328	Ground floor central store room - adhesive below VFC	Adhesive	No Asbestos Detected

Polo Flat Airport			
Sample reference	**Sample location**	**Sample type**	**Composition Asbestos type**
C2329	Ground floor open hangar - infill panel on timber beam east end	Sheet	No Asbestos Detected

NATA accredited laboratory:

Robson Environmental Pty Ltd
Accreditation number: 3181

Chrysotile = white asbestos

Amosite = grey or brown asbestos

Crocidolite = blue asbestos

It should be noted that the above samples were a representative selection of materials suspected of containing asbestos.

On-site inspections and an examination of the Asbestos Register within this report should be undertaken prior to the commencement of any asbestos removal programme.

4.4 Risk Assessment

The purpose of the risk assessment is to enable informed decisions to be made concerning the control of ACM.

The risk assessment should take account of the identification information in the Asbestos Register, including:

- type of ACM (non-friable or friable)
- condition and location of ACM
- whether the ACM is likely to be disturbed due to its condition and location
- the likelihood of exposure

Types of ACM

Non-friable ACM	Non-friable ACM is any material that contains asbestos bound into a stable matrix. It may consist of cement or various resins/binders and cannot be reduced to a dust by hand pressure. As such it does not present an exposure hazard unless cut, abraded, sanded or otherwise disturbed. Therefore, the exposure risk from non-friable ACM is negligible during normal building occupation. *Note: If non-friable ACM is damaged or otherwise deteriorated, the risk assessment may be reviewed to reflect a higher potential for exposure to asbestos fibres. A licensed Asbestos Assessor should perform the risk assessment.*
Friable ACM	Friable ACM can be crumbled or reduced to a dust by hand pressure when dry and can represent a significant exposure hazard. Examples of friable asbestos are hot water pipe lagging, severely damaged asbestos cement sheet, limpet spray to structural beams and electrical duct heater millboard.

ACM CONDITION RATING

1	**Severe**	Deteriorated surface in extremely poor condition
2	**Poor**	Deteriorated material
3	**Normal**	Stable asbestos with little damage
4	**Good**	Well sealed stable surfaces in accessible locations

ACM RISK RATING

A	**Very High**	Exposure to airborne asbestos as a consequence of extremely minor disturbance
B	**High**	Exposure to airborne asbestos likely as a consequence of significant disturbance
C	**Medium**	Exposure to airborne asbestos unlikely during normal building use
D	**Low**	No exposure to airborne asbestos during normal building use

4.5 Asbestos Register

The Asbestos Register details the type, location, risk assessment and action required for all identified ACM. The Register should be accessed to inform all decisions made concerning control of ACM. Action taken to control ACM must be recorded in this Register in order to comply with current legislation.

Table 3A: Asbestos Register

Administration Building							
Sample No.	**Material Description & Location**	**Condition Rating**	**Risk Rating**	**Approx Quantity**	**Recommended Management Action**	**Action Undertaken**	**Assessor/ Date assessed**
VA02	Ground floor toilets - woven product - Insulation to light wiring (Presumed Friable)	4	C	1 no	Label and maintain Inspect every 5 years		

Polo Flat Airport							
Sample No.	**Material Description & Location**	**Condition Rating**	**Risk Rating**	**Approx Quantity**	**Recommended Management Action**	**Action Undertaken**	**Assessor/ Date assessed**
VA01	Ground floor hangar west end - sheet - electrical switchboard backing (Presumed Non-Friable)	3	D	1	Label and maintain Inspect annually		

Refer to Section 2.4 Table 1B for presumed ACM and Section 3.2 for exclusions

Table 3B: Register of sampled materials which have been confirmed as non ACM

Administration Building		
Sample number	**Type**	**Locations**
C2307	Putty	Ground floor external - window sills
C2308	Cement sheet	Ground floor external (south end) - eaves
C2309	Putty	Ground floor external (north end) - window sills
C2310	Cement sheet	Ground floor external - north walkway ramp floor
C2312	Cement sheet	Subfloor - wall panels below deck area
C2313	Putty	Subfloor external (southwest) - window sills
C2314	Cement sheet	Subfloor - packers
C2315	Sheet debris	Subfloor - ground
C2316	Cement sheet	Ground floor showers - south wall
C2317	Cement sheet	Ground floor disabled toilet - south wall
C2318	Vinyl floor tile	Ground floor laundry - floor
C2319	Mastic	Ground floor workshop - window sills
C2320	Cement sheet	Ground floor workshop storage area - internal wall
C2321	Soffit board	Ground floor office - ceiling
C2322	Bituminous pad to underside of sink	Ground floor kitchen - sink pad
C2330	Vinyl floor covering	Ground floor toilet - floor
C2331	Vinyl floor tile	Ground floor toilet - floor below VFC

Hangars		
Sample number	**Type**	**Locations**
C2323	Sheet	Ground floor hangar warehouse - west and north walls
C2324	Vinyl floor tile	Ground floor hangar store room - cream tiles to floor
C2325	Adhesive	Ground floor hangar store room - below cream VFT
C2326	Mastic	Ground floor hangar store room - window sealant
C2327	Vinyl floor covering	Ground floor central store room - to floor
C2328	Adhesive	Ground floor central store room - adhesive below VFC

Polo Flat Airport		
Sample number	**Type**	**Locations**
C2329	Sheet	Ground floor open hangar - infill panel on timber beam east end

5 LEAD PAINT SURVEY RESULTS

5.1 Introduction

Lead paint is defined by the Australian Standard (AS 4361.2 – 2017 Guide to hazardous paint management Part 2: Lead paint in residential, public and commercial buildings) as a paint or component coat of a paint system containing lead or lead compounds, in which the lead content (calculated as lead metal) is in excess of 0.1% by weight of the dry film as determined by laboratory testing.

Analytical values of ≤ 0.1% Pb allow the sample to be categorised as being lead free paint.

5.2 Results

Paint was tested during the hazardous materials survey using 3M™ LeadCheck™ Swabs which have a detection limit of 0.06% w/w lead, sufficient to classify paint as lead free under AS4361.2-2017. Where requested by the client, deemed prudent by the assessor, or required due to inconclusive results from this test, representative paint samples were also collected in accordance with AS4361.2-2017 and analysed for lead content. In general however as the detection limit of 0.06% w/w lead is only slightly lower than the threshold for lead paint of 0.10% lead set out in AS4361.2-2017 it is generally satisfactory to treat a positive result with 3M™ LeadCheck™ Swabs as being indicative of lead paint, obviating the need for further sampling and analysis.

The sampling criterion provided below is taken from AS4361.2-2017 Section A4 Sampling Strategy clauses (a, b, c);

(a) An adequate number of sample sites should be analysed to properly characterise the paint systems present on site.

(b) For small surfaces such as architraves, windows and doors and cupboards, a **single** sample may suffice.

(c) For large, uniformly painted surface areas such as the exterior facade of high rise buildings, or for interior walls and ceilings of large rooms, and where laboratory testing is employed, **composite** samples should be taken from three separate locations in 10m² sections.

Collected paint samples were analysed for their lead (Pb) content by Envirolab Services Pty Ltd – NATA accreditation number: 2901 using ICP/AES techniques and in-house Method No.4.

Within the same building, wherever a paint coating had a similar surface texture, colour, etc. to a paint coating that had already been sampled because of its suspected lead content, it was presumed that these paint coatings were identical. However, results can only be guaranteed valid for directly tested/sampled paints (especially due to deliberate attempts to match new paint to existing coatings in some applications).

Table 4: Lead Composition in Paint by Inductively-Coupled Plasma Spectroscopy

Administration Building				
Sample No.	**Item No.**	**Sample location**	**Colour**	**Lead in Paint %**
03	PB1341	Ground floor throughout - internal wall	White	0.11
04	PB1345	Ground floor throughout - window and door trims	White	0.11
05	PB1340	Ground floor throughout - window and door trims	Blue	0.11
06	PB1343	Exterior throughout - window and door trims	Blue	0.11
07	PB1346	Exterior throughout - walls	White	0.11
08	PB1344	Exterior throughout - walls	Yellow	0.11
09	PB1342	Exterior throughout - gutters	Green	0.11

Polo Flat Airport				
Sample No.	**Item No.**	**Sample location**	**Colour**	**Lead in Paint %**
01	PB1338	Ground floor open hanger - to wall and trims	White	0.11
02	PB1339	Ground floor open hanger - to structural beams	Yellow	0.11

Notes:

Lead Paint	(> 0.1% Pb)
Lead-free Paint	(≤ 0.1% Pb)

5.3 Discussion and Conclusion

The lead swab result(s) of paint sampling revealed that all interior and exterior paint contains lead. Most of the exterior paint surfaces are in poor condition. They should be encapsulated or removed by a qualified person.

It is recommended that lead paint be maintained. Any areas that begin to flake, peel or otherwise deteriorate should be appropriately remediated. If the paint is to be removed this should be undertaken by a suitably qualified person.

It should be assumed that all similar paint(s) throughout the premises contains comparable percentages of lead.

6 Synthetic Mineral Fibre (SMF) Survey Results

6.1 Introduction

SMF is a generic term used to collectively describe a number of amorphous (non-crystalline) fibrous materials including glass fibre, mineral wool (Rockwool and Slagwool) and ceramic fibre. Generally referred to as SMF, these materials are also known as ‘Man-Made Mineral Fibres’ (MMMF).

SMF products are used extensively in commercial and residential buildings for thermal and acoustic insulation, and as a reinforcing agent in cement, plaster and plastic materials. In some specialised instances, SMF materials have also been used as alternatives to asbestos, especially where high temperature insulation properties are required.

There are two basic forms of SMF insulation **bonded** and **unbonded.**

The **bonded form** is where adhesives, binding agents, facing/cladding, cement or other sealants have been applied to the SMF before delivery and the SMF product has a specific shape (e.g. a binding or sealing agents hold the SMF in a batt or blanket form). Some bonded SMF materials may also be clad in various coverings on one or more sides (e.g. a silver foil backing).

The **unbonded form** has no adhesives, binding agents, facing/cladding or sealants applied, and the SMF is a loose material (e.g. wet spray and loose fill).

6.2 Results

Table 5: Visual Assessment of Samples

Administration Building			
Item No	**Location**	**Sample Type**	**Form**
SMF1219	Ground floor laundry – to hot water heater	Insulation	Bonded
SMF1213	Ground floor office ceiling space	Batts	Bonded

6.3 Conclusion

SMF was identified to the hot water heater located in the laundry and the office ceiling space. If building work is likely to significantly disturb the insulation, the SMF materials should be removed using effective dust control procedures.

Refer to Appendix D for safe SMF handling.

7 POLYCHLORINATED BIPHENYLS (PCB) SURVEY RESULTS

7.1 Introduction

PCB is the common name for polychlorinated biphenyls. PCBs range in appearance from colourless, oily liquids to more viscous and increasingly darker liquids, to yellow then black resins, depending on the chlorine content of the PCB.

PCBs are chemically stable synthetic compounds that do not degrade appreciably over time or with exposure to high temperatures. The major use of PCBs was as an insulating fluid inside transformers and capacitors. Capacitors containing PCBs were installed in various types of equipment including domestic appliances, motors and fluorescent light fittings during the 1950s, 60s and 70s.

These applications generally do not present an immediate risk to human health or the environment as the equipment is sealed and contains relatively small amounts of PCB. The equipment can continue to be used safely provided that the capacitors do not leak.

The Australian and New Zealand Environment and Conservation Council (ANZECC) in its *PCB Management Plan* of *2003* stipulate cessation dates for the generation of PCB scheduled waste, the use of articles containing PCB scheduled waste, and the disposal of PCB scheduled waste*.

> * PCB scheduled waste means any PCB material that has no further use that contains PCBs at levels at, or in excess of 50mg/kg and is of a quantity of 50g or more.

Small equipment items and capacitors found in households and commercial buildings that contain scheduled PCBs (i.e. at or in excess of 50mg/kg) are to be disposed of as scheduled PCB waste. Where the aggregate weight of the items or capacitors exceeds 10kg, they must be notified to the relevant Commonwealth, State or Territory Government agency prior to their disposal.

7.2 Results

Table 6: PCB and non PCB Containing Capacitors Identified on fluorescent light fittings

PCB - Administration Building			
Item No.	**Location**	**Make - Type**	**Capacitance (µF)**
PCB469	Ground floor warehouse and art workshop	AEE - FW	6.5

Non-PCB - Administration Building			
Item No.	**Location**	**Make - Type**	**Capacitance (µF)**
PCB470	Ground floor office	RIC - LEIEB	6

* Note that light fittings were only inspected where they were isolated by a qualified electrician. Live light fittings were not inspected, and accordingly no determination about whether or not they contain PCB is included in this report.

For further PCB management information refer to Appendix D.

8 OZONE DEPLETING SUBSTANCES SURVEY RESULTS

The site was surveyed for the presence of air conditioning and refrigeration units that contain ozone depleting substances.

ODS are used for heat transfer in refrigeration and air conditioning systems, absorbing or releasing heat according to vapour pressure. Release of these substances to the atmosphere has the ability to cause long term atmospheric pollution that can lead to ozone depletion, global warming, petrochemical smog and acid rain.

The ozone depletion potential (ODP) of a fluorocarbon refrigerant gas, its global warming potential (GWP) and estimated atmospheric life (EAL) all contribute to its potential to deplete the stratospheric ozone layer and enhance the greenhouse effect leading to global warming.

Chlorofluorocarbons (CFCs) contain chlorine and possess a large ODP, high GWP and long EAL. They are generally found in refrigeration and air-conditioning systems e.g. centrifugal chillers.

Hydrochlorofluorocarbons (HCFCs) are less saturated with chlorine than are CFCs and the hydrogen within these compounds give the HCFCs a much shorter EAL and lower ODP. They are generally found in refrigeration systems that are used for food display, cold stores and self contained, split, multi-split and central plant chillers used for building air-conditioning.

Hydrofluorocarbons (HFCs) are a class of replacement gases for CFCs. They do not contain chlorine or bromine and therefore do not deplete the ozone layer. While all HFCs have an ODP of zero, some do have a high GWP (e.g. R-404A, R-407B, R-125 etc).

Halons are synthetic chemical compounds that contain one or two carbon atoms, bromine and other halogens. They have a long atmospheric lifetime and cause very aggressive ozone depletion when breaking down in the stratosphere. Halons were introduced into Australia as fire-extinguishing agents in the early 1970s and quickly replaced many previously accepted fire-fighting products because of their superior fire-extinguishing characteristics and ease of use.

Halon 1211 was commonly used in portable fire extinguishers, while fixed fire protection systems, such as those that protect computer rooms and ship engine rooms, commonly contained Halon 1301.

Halon 1301 has an ODP that is 10 times greater that of CFCs, while Halon 1211 has an ODP 3 times greater than that of CFCs.

8.1 Results

Table 7: Chemical properties of ODS located during survey

Administration Building						
ODS Item No	**Location**	**R Number**	**Chemical name**	**ODP**	**GWP**	**EAL**
ODS738	Ground floor offices - AC wall unit	R-22	CFCIF2	0.055	1700	13.3

Chemical properties of non ODS located during survey

Non ODS	Location	R Number	Chemical name	ODP	GWP	EAL
No non-ozone depleting substances located						

For further refrigerant management information refer to Appendix D.

9 FUEL STORAGE FACILITIES

It is important to note that prior to the introduction of natural gas commercial premises generally utilised heating systems where boilers were fuelled by diesel or heating oils which were stored in USTs.

For the long-term management of sites with redundant fuel storage tanks, Robson Environmental Pty Ltd recommends that the USTs be removed (where possible) in accordance with the requirements of Safework NSW and the relevant local authority.

USTs still in use are to be managed in accordance with the requirements of the UPSS Regulation. This is discussed further in Appendix D.

Removal of USTs may require approvals from the relevant local authority and should be undertaken in accordance with the UPSS Regulation and Safework NSW Guidelines.

9.1 Results

Polo Flat Airport			
A/UST Type	**Item No**	**Location**	**Recommendations**
No storage tanks located			

- Note that there are approximately 10 fuel drums stored at the south end of the open hangar. Robson Environmental recommends that the fuel drums be removed in accordance with the requirements of SafeWork NSW and the NSW Environmental Protection Authority

10 ASBESTOS MANAGEMENT

10.1 Management of ACM

General requirements

- ACM identified as representing an exposure risk (see Table 3A Asbestos Register) should be removed or otherwise controlled.
- Any ACM that is not scheduled for immediate removal should be labelled with appropriate warnings and maintained in good condition.
- The location of ACM must be entered into the Asbestos Register.
- Maintenance and other personnel must be made aware of the location of ACM.
- The Asbestos Register must be freely available.
- Unless they have a valid SafeWork NSW Asbestos Removal licence, maintenance workers, trades or occupants shall not remove or knowingly damage >10m² of identified non friable ACM or any amount of friable ACM.
- Before any planned demolition, refurbishment or maintenance, its effect upon any in situ asbestos must be established by reference to this document, including amendments.

10.2 Management of Contractors

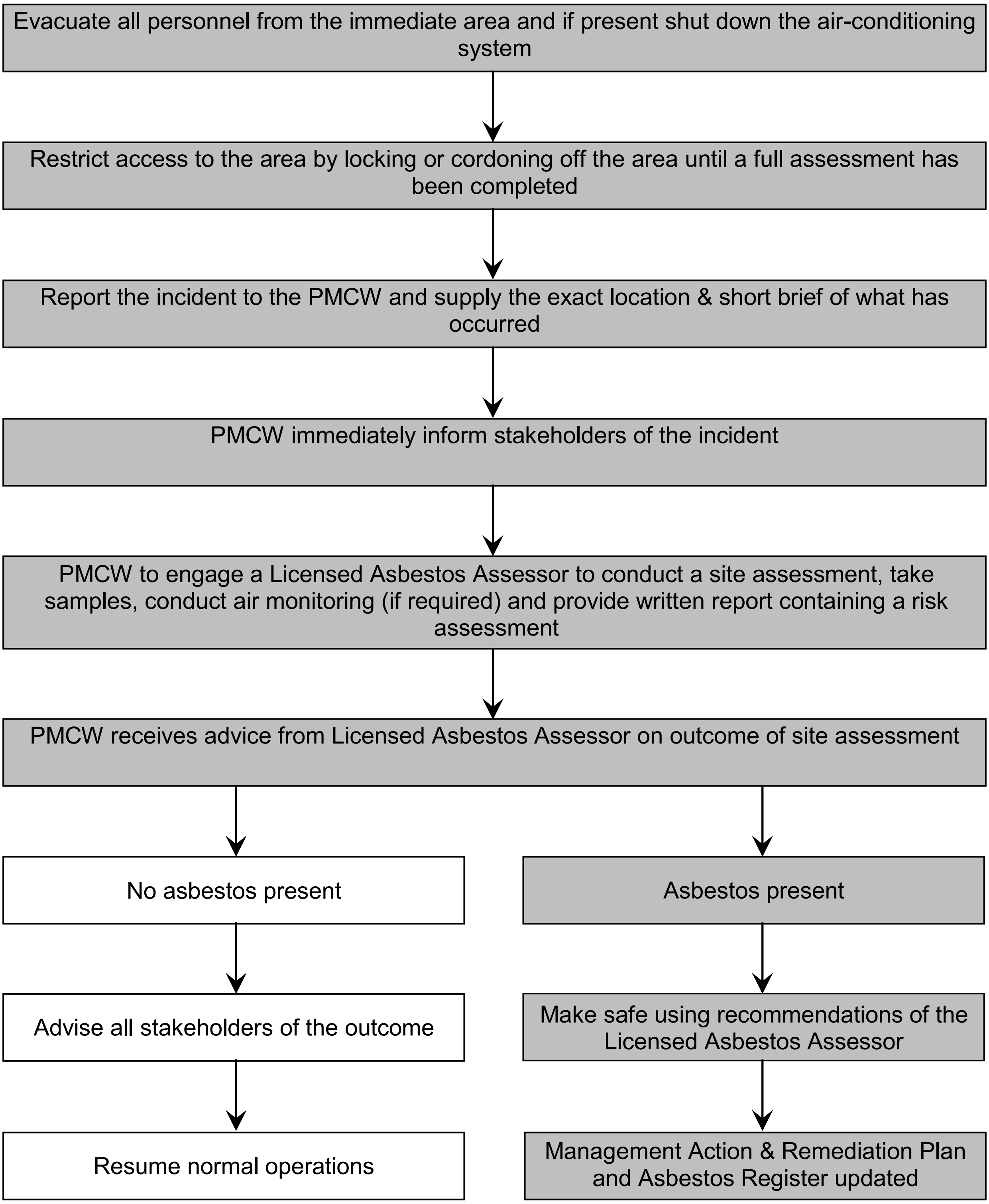
Before any contractor is engaged to carry out work on a site, the Asbestos Register, site plan and photographs should be checked to ensure the work will not interfere with, or disturb asbestos containing materials (ACM).

The chart below should be used by the PMCW to induct contractors onto sites:

Contractor arrives on site	Check Safe Work Method Statement (SWMS) and Trade Licenses (including Asbestos Awareness training) of all personnel involved in the work
Induct contractor	Conduct contractor's induction for the personnel involved in the work and ensure they are aware of any special requirements for ACM, security, no smoking, etc.
Check the Asbestos Register	The Asbestos Register and plan should be readily accessible (i.e. front office/reception) and in colour. Check the Asbestos Register with the contractor for ACM in the proposed work area.
Is asbestos present in the work area?	
No	**Yes**
Contractor may proceed with work	
Will the asbestos be disturbed?	
No	**Yes**
Contractor may proceed with work	**No work to be conducted – contact the PMCW immediately informing them of the problem.**

10.3 Asbestos Emergency Procedures

The following course of action should be taken **immediately** if ACM or suspected ACM is disturbed, or is accidentally damaged.



10.4 PMCW Decision Record

Option 1: Defer action

Item no.	ACM and Location	Reason	Authorisation	Date

Option 2: Encapsulate or seal

Item no.	ACM and Location	Reason	Authorisation	Date

Option 3: Removal

Item no.	ACM and Location	Reason	Authorisation	Date

10.5 Timetable for Action

The timetable for action should be administered to ensure the PMCW has a clear plan for all works which may affect ACM in the workplace. This includes maintenance work, scheduled removal work and risk assessment reviews, which may impact ACM.

Table 8: Timetable for action

ACM removal/ work	Date of scheduled works	Details	Authorisation	Date
Asbestos review/audit	**Date of scheduled review**	**Details**	**Authorisation**	**Date**

11 RESPONSIBILITIES

11.1 Asbestos - Provision of Information

The PMCW must:

- ensure the ACM register and all relevant information pertaining to asbestos in the workplace is freely available upon request
- provide occupants with up-to-date information relating to the condition and relative risk of ACM in the workplace
- provide information on the control measures in place to contain ACM-related risk and
- provide information to staff and contractors on measures to be taken to ensure that they are not exposed to asbestos in the workplace, either through accident or negligence

PMCW Action Record

Record all communication activities undertaken to inform staff/occupants of ACM in the workplace.

Action	Authorisation	Date

11.2 Updating the Risk Assessment

The register of ACM, including any risk assessments, should be reviewed every 12 months or earlier where:

- a risk assessment indicates the need for reassessment; or
- any ACM has been disturbed or moved

A visual inspection of identified ACM should be undertaken as part of any review.

Each review should critically assess all asbestos management procedures and their effectiveness in:

- preventing exposure to asbestos fibres
- controlling access to asbestos
- highlighting the need for action to maintain or remove ACM
- maintaining the accuracy of the ASMP

Details of any mitigating actions must be recorded in the Asbestos Register (refer Table 3A).

11.3 Key Personnel

This section outlines the responsibilities of all persons involved in the safe management of ACM.

1. PMCW

Name:	
Contact details:	
Responsibilities:	*e.g. provision of information*

2. Occupational Health and Safety Representative

Name:	
Contact details:	
Responsibilities:	*e.g. keeping occupants informed of any changes to the status of ACM in the workplace*

3. Facilities Management (if applicable)

Name:	
Contact details:	
Responsibilities:	*e.g. arrange removal and repair works as required; maintaining the HMSMP*

4. Other

Name:	
Contact details:	
Responsibilities:	

12 ASBESTOS REMOVAL WORKS

12.1 PMCW Responsibilities

Where it has been determined that ACM is to be removed, the PMCW must ensure that a risk assessment is performed before the removal work commences and that the removalist takes this risk assessment into account. The risk assessment must include the possibility of uncovering previously concealed ACM, and that concealed ACM is subsequently identified by a licensed Asbestos Assessor.

The PMCW should provide a detailed scope of works prepared by a licensed Asbestos Assessor for the removalist, including potential hazards, details on areas, which contain asbestos and arrangements for clearance inspections and airborne fibre monitoring.

12.2 Removalist Responsibilities

Before the commencement of removal work, the licensed removal contractor must:

- Provide a site-specific Asbestos Removal Control Plan(ARCP)
- Ensure the removal is adequately supervised and carried out in a safe manner
- Ensure that the equipment used in the project is appropriate for the task
- Ensure all persons carrying out the removal are competent and trained for the type of work being carried out
- Demonstrate that they have a health surveillance program in accordance with the requirements of Code Of Practice: How To Safely Remove Asbestos

12.3 Licensing Requirements

All Asbestos Removalists in NSW are licensed by SafeWork NSW.

As a minimum the holder of a NSW Asbestos Removal Licence is required to demonstrate practical experience in the industry for at least three years and possess a full and complete understanding of the requirements of:

- *How to Manage and Control Asbestos in the Workplace Code of Practice*
- *How to Safely Remove Asbestos Code of Practice*
- *Work Health and Safety Act 2011*
- *Work Health and Safety Regulations 2011*

12.4 Approval to Begin Asbestos Removal Works

- All removal methods and procedures are required to be undertaken in accordance with current legislation.
- The PMCW in conjunction with a licensed Asbestos Assessor where required, will inform the asbestos removalist of the ‘Scope of Works’.
- The licensed Asbestos Assessor will be required to provide a clearance certificate on satisfactory completion of the works.

12.5 Emergency Work in Areas Containing Asbestos

- If emergency access is required contact the PMCW.
- If the PMCW determines that asbestos is likely to be disturbed, all works must be undertaken in accordance with current legislation - that is, a licensed Asbestos Removalist must be contracted to undertake any asbestos removal works.
- A licensed Asbestos Assessor will be required to provide a clearance certificate on satisfactory completion of the works.

12.6 Monitoring Arrangements

Control air monitoring should be performed when indicated by a Risk Assessment to ensure the control measures are effective.

All air monitoring must be performed by a licensed Asbestos Assessor accredited to perform air sampling for asbestos. Sampling should be performed in accordance with the *Guidance Note on the Membrane Filter Method for Estimating Airborne Asbestos Fibres* [NOHSC: 3003 (2005)].

It is the Asbestos Removalist’s responsibility to ensure that the maximum fibre levels throughout asbestos removal and associated works does not equal or exceed the minimum practical detection limit of 0.01 fibres per millilitre of air (F/ml). If the airborne fibre levels are observed at or exceeding those specified below, the licensed Asbestos Assessor will instruct the contractor to take the appropriate control /action as per current legislation.

Table 9: Control levels and required actions

Control Level (airborne asbestos fibres/ml)	Control/Action
< 0.01	Continue with control measures
≥ 0.01	Review control measures
≥ 0.02	Stop removal work and find the cause

12.7 Clearance Inspections

Following removal work, a licensed Asbestos Assessor must undertake a clearance inspection before re-occupation of an asbestos work area.

All barriers and warning signs should remain in place until the area has been cleared.

12.8 ACM removal/maintenance record

The Asbestos Register, Section 4.5, Table 3A is to be completed by the PMCW after receiving appropriate clearance certification from a licensed Asbestos Assessor.

The ‘Work Performed’ and ‘Asbestos Control Measure’ Tables are required to be completed by the PMCW.

1. Work Performed

Company name	Contact details	Date of work + job no.	Scope of work

2. Asbestos Control Measures

Work performed	Air monitoring/ decontamination	Clearance certificate issued	Other

3. Additional Information

13 FURTHER INFORMATION

13.1 Useful Contacts

Additional information on asbestos can be obtained from the following organisations and agencies.

SafeWork NSW Office locations across NSW.
offices open from 8:30am to 4:30pm Monday to Friday.

Head office

Gosford
92-100 Donnison Street GOSFORD 2250
Phone (02) 4321 5000 Fax (02) 4325 4145

Postal address: SafeWork NSW Locked Bag 2906 LISAROW 2252

Regional & Local Offices

Newcastle – Regional Office

Level 1, Suite C
Cnr Fitzroy and Cowper Street
CARRINGTON 2294
Phone (02) 4921 2900
Fax (02) 4940 8558

Goulburn

Lower Ground Floor
159 Auburn Street
GOULBURN 2580
Phone (02) 4824 1500
Fax (02) 4822 1242

Wollongong – Regional Office

Level 1, 60 Burelli Street
WOLLONGONG 2500
Phone (02) 4222 7333
Fax (02) 4226 9087

Griffith

Suites G06 & G07
Government Office Block
104-110 Banna Avenue
GRIFFITH 2680
Phone (02) 6962 8900
Fax (02) 6964 1738

Albury

Suite 5, 1st Floor
429 Swift Street
ALBURY 2640
Phone (02) 6042 4600
Fax (02) 6041 2580

Narrabri

Suite 6, Level 1
100 Maitland Street
NARRABRI 2390
Phone (02) 6792 8720
Fax (02) 6792 3532

Ballina

11 Grant Street
BALLINA 2478
Phone (02) 6620 6900
Fax (02) 6681 6100

Nowra

Level 1, 5 O'Keefe Avenue
NOWRA 2541
Phone (02) 4428 6700
Fax (02) 4422 4997

Baulkham Hills

Level 4, 2 Burbank Place
Norwest Business Park
Baulkham Hills NSW 2153
Phone (02) 8867 2700
Fax (02) 9287 4087

Orange

74 McNamara Street
ORANGE 2800
Phone (02) 6392 7600
Fax (02) 6362 8820

Bega

1/248 Carp Street
BEGA 2550
Phone (02) 6491 6600
Fax (02) 6494 7151

Parramatta

Level 4, 128 Marsden Street
PARRAMATTA 2150
Phone (02) 9841 8550
Fax (02) 9891 1474

Coffs Harbour

Suite 33, Jetty Village Shopping Centre
361 Harbour Drive
COFFS HARBOUR 2450
Phone (02) 6659 1700
Fax (02) 6652 8213

Port Macquarie

Suite 5, 53 Lord Street
PORT MACQUARIE 2444
Phone (02) 6588 7000
Fax (02) 6584 1788

Dubbo

Level 2, 1 Church Street
DUBBO 2830
Phone (02) 6841 7900
Fax (02) 6884 2808

Tamworth

126 Marius Street
TAMWORTH 2340
Phone (02) 6767 2500
Fax (02) 6766 4972

Wagga Wagga

76 Morgan Street
WAGGA WAGGA 2650
Phone (02) 6933 6500
Fax (02) 6937 3616

Comcare

GPO Box 9905

Canberra ACT 2601

Phone: 1300 366 979

Email: general.enquires@comcare.gov.au

Internet: www.comcare.gov.au

NSW Environmental Protection Agency

EPA Head Office

PO Box A290

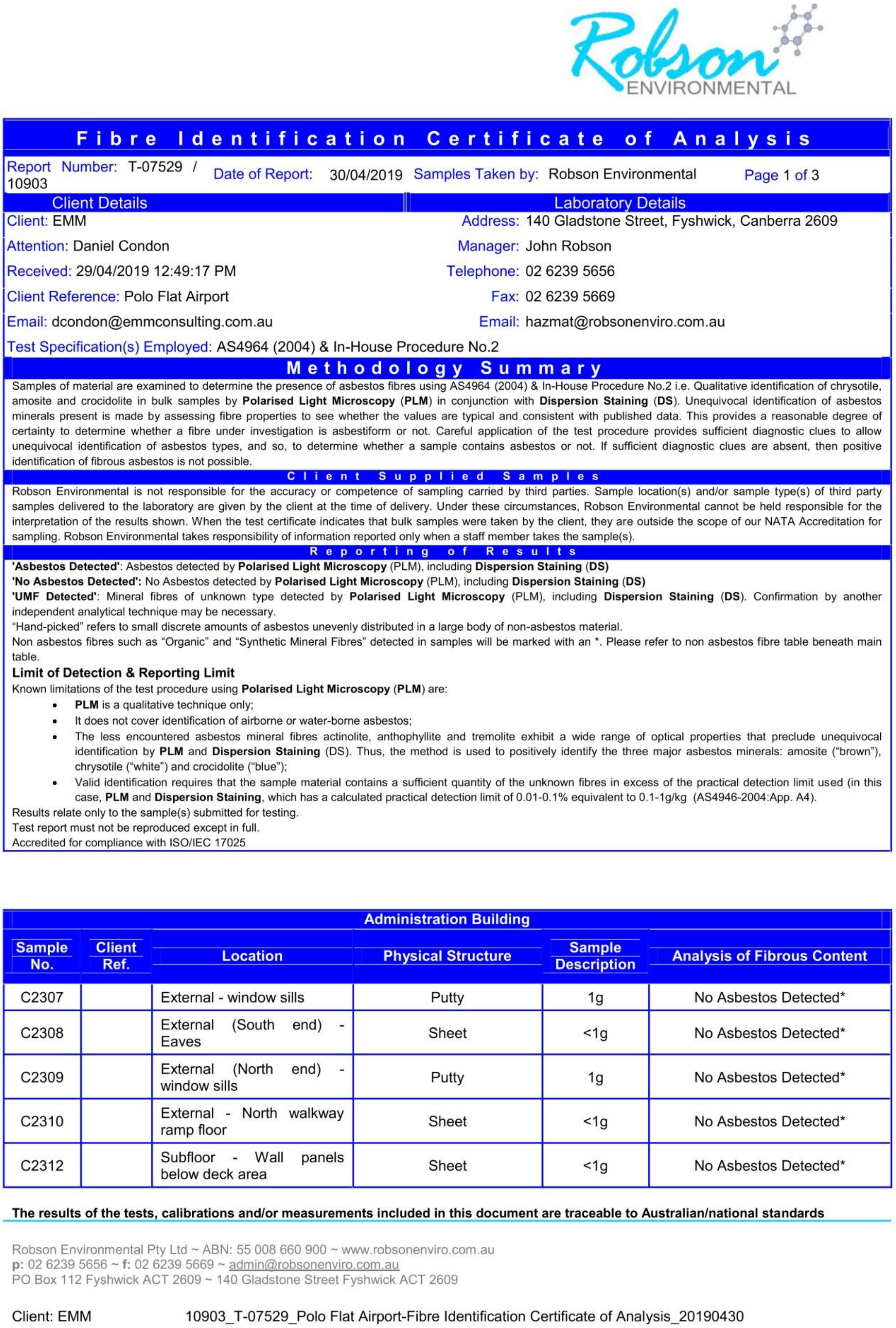
Sydney South NSW 1232

Phone (02) 9995 5555

Fax (02) 9995 5999

14 APPENDICES

14.1 APPENDIX A – Laboratory Reports



Fibre Identification Certificate of Analysis

Report Number: T-07529 / 10903 | Date of Report: 30/04/2019 | Samples Taken by: Robson Environmental | Page 1 of 3

Client Details	Laboratory Details
Client: EMM	Address: 140 Gladstone Street, Fyshwick, Canberra 2609
Attention: Daniel Condon	Manager: John Robson
Received: 29/04/2019 12:49:17 PM	Telephone: 02 6239 5656
Client Reference: Polo Flat Airport	Fax: 02 6239 5669
Email: dcondon@emmconsulting.com.au	Email: hazmat@robsonenviro.com.au

Test Specification(s) Employed: AS4964 (2004) & In-House Procedure No.2

Methodology Summary

Samples of material are examined to determine the presence of asbestos fibres using AS4964 (2004) & In-House Procedure No.2 i.e. Qualitative identification of chrysotile, amosite and crocidolite in bulk samples by **Polarised Light Microscopy** (**PLM**) in conjunction with **Dispersion Staining** (**DS**). Unequivocal identification of asbestos minerals present is made by assessing fibre properties to see whether the values are typical and consistent with published data. This provides a reasonable degree of certainty to determine whether a fibre under investigation is asbestiform or not. Careful application of the test procedure provides sufficient diagnostic clues to allow unequivocal identification of asbestos types, and so, to determine whether a sample contains asbestos or not. If sufficient diagnostic clues are absent, then positive identification of fibrous asbestos is not possible.

Client Supplied Samples

Robson Environmental is not responsible for the accuracy or competence of sampling carried by third parties. Sample location(s) and/or sample type(s) of third party samples delivered to the laboratory are given by the client at the time of delivery. Under these circumstances, Robson Environmental cannot be held responsible for the interpretation of the results shown. When the test certificate indicates that bulk samples were taken by the client, they are outside the scope of our NATA Accreditation for sampling. Robson Environmental takes responsibility of information reported only when a staff member takes the sample(s).

Reporting of Results

'Asbestos Detected': Asbestos detected by **Polarised Light Microscopy** (PLM), including **Dispersion Staining (DS)**
'No Asbestos Detected': No Asbestos detected by **Polarised Light Microscopy** (PLM), including **Dispersion Staining (DS)**
'UMF Detected': Mineral fibres of unknown type detected by **Polarised Light Microscopy** (PLM), including **Dispersion Staining** (**DS**). Confirmation by another independent analytical technique may be necessary.
"Hand-picked" refers to small discrete amounts of asbestos unevenly distributed in a large body of non-asbestos material.
Non asbestos fibres such as "Organic" and "Synthetic Mineral Fibres" detected in samples will be marked with an *. Please refer to non asbestos fibre table beneath main table.

Limit of Detection & Reporting Limit

Known limitations of the test procedure using **Polarised Light Microscopy** (**PLM**) are:

- **PLM** is a qualitative technique only;
- It does not cover identification of airborne or water-borne asbestos;
- The less encountered asbestos mineral fibres actinolite, anthophyllite and tremolite exhibit a wide range of optical properties that preclude unequivocal identification by **PLM** and **Dispersion Staining** (DS). Thus, the method is used to positively identify the three major asbestos minerals: amosite ("brown"), chrysotile ("white") and crocidolite ("blue");
- Valid identification requires that the sample material contains a sufficient quantity of the unknown fibres in excess of the practical detection limit used (in this case, **PLM** and **Dispersion Staining**, which has a calculated practical detection limit of 0.01-0.1% equivalent to 0.1-1g/kg (AS4946-2004:App. A4).

Results relate only to the sample(s) submitted for testing.
Test report must not be reproduced except in full.
Accredited for compliance with ISO/IEC 17025

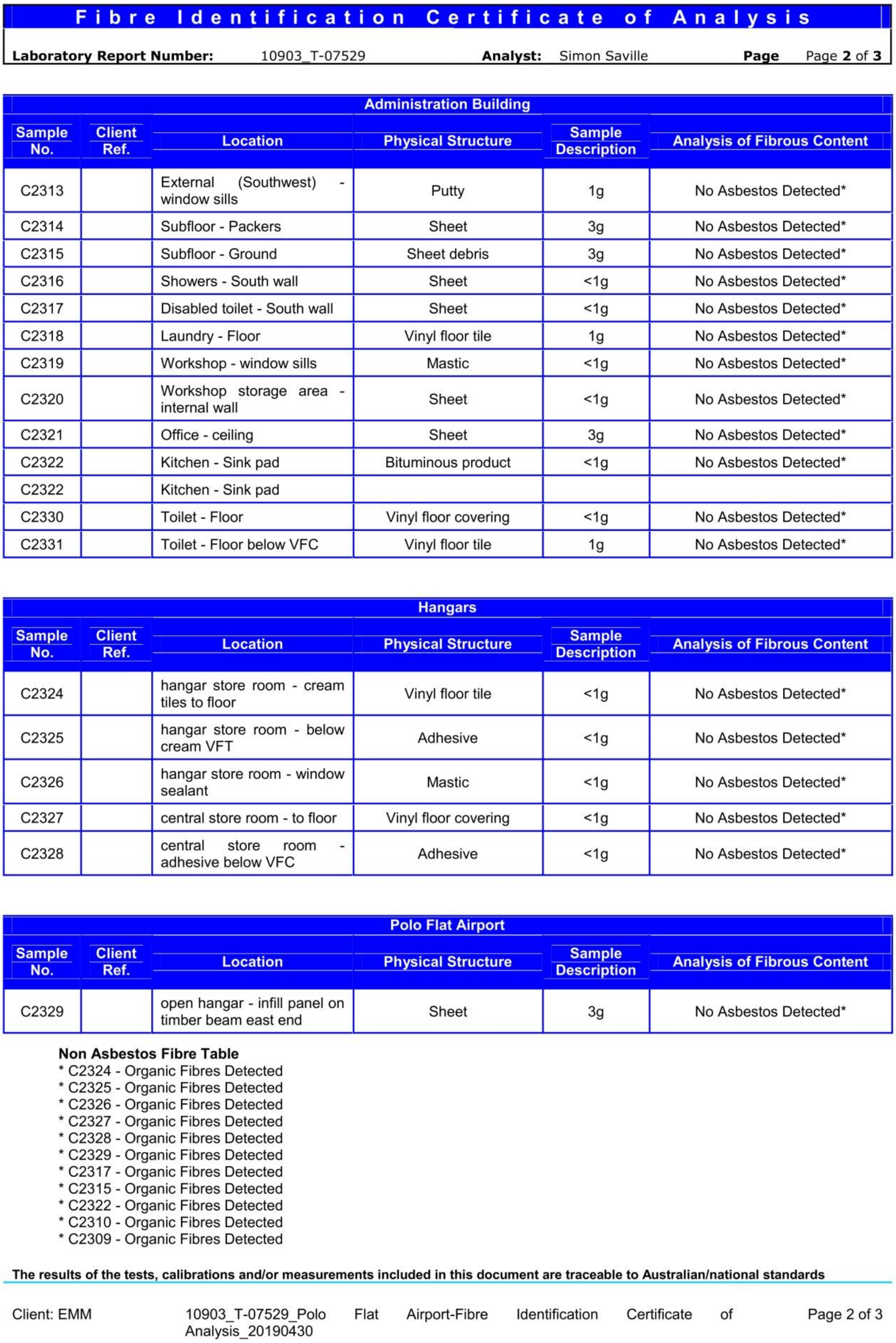
Administration Building

Sample No.	Client Ref.	Location	Physical Structure	Sample Description	Analysis of Fibrous Content
C2307		External - window sills	Putty	1g	No Asbestos Detected*
C2308		External (South end) - Eaves	Sheet	<1g	No Asbestos Detected*
C2309		External (North end) - window sills	Putty	1g	No Asbestos Detected*
C2310		External - North walkway ramp floor	Sheet	<1g	No Asbestos Detected*
C2312		Subfloor - Wall panels below deck area	Sheet	<1g	No Asbestos Detected*

The results of the tests, calibrations and/or measurements included in this document are traceable to Australian/national standards

Robson Environmental Pty Ltd ~ ABN: 55 008 660 900 ~ www.robsonenviro.com.au
p: 02 6239 5656 ~ **f:** 02 6239 5669 ~ admin@robsonenviro.com.au
PO Box 112 Fyshwick ACT 2609 ~ 140 Gladstone Street Fyshwick ACT 2609

Client: EMM 10903_T-07529_Polo Flat Airport-Fibre Identification Certificate of Analysis_20190430



Fibre Identification Certificate of Analysis

Laboratory Report Number: 10903_T-07529 **Analyst:** Simon Saville **Page** Page **2** of **3**

Administration Building

Sample No.	Client Ref.	Location	Physical Structure	Sample Description	Analysis of Fibrous Content
C2313		External (Southwest) - window sills	Putty	1g	No Asbestos Detected*
C2314		Subfloor - Packers	Sheet	3g	No Asbestos Detected*
C2315		Subfloor - Ground	Sheet debris	3g	No Asbestos Detected*
C2316		Showers - South wall	Sheet	<1g	No Asbestos Detected*
C2317		Disabled toilet - South wall	Sheet	<1g	No Asbestos Detected*
C2318		Laundry - Floor	Vinyl floor tile	1g	No Asbestos Detected*
C2319		Workshop - window sills	Mastic	<1g	No Asbestos Detected*
C2320		Workshop storage area - internal wall	Sheet	<1g	No Asbestos Detected*
C2321		Office - ceiling	Sheet	3g	No Asbestos Detected*
C2322		Kitchen - Sink pad	Bituminous product	<1g	No Asbestos Detected*
C2322		Kitchen - Sink pad			
C2330		Toilet - Floor	Vinyl floor covering	<1g	No Asbestos Detected*
C2331		Toilet - Floor below VFC	Vinyl floor tile	1g	No Asbestos Detected*

Hangars

Sample No.	Client Ref.	Location	Physical Structure	Sample Description	Analysis of Fibrous Content
C2324		hangar store room - cream tiles to floor	Vinyl floor tile	<1g	No Asbestos Detected*
C2325		hangar store room - below cream VFT	Adhesive	<1g	No Asbestos Detected*
C2326		hangar store room - window sealant	Mastic	<1g	No Asbestos Detected*
C2327		central store room - to floor	Vinyl floor covering	<1g	No Asbestos Detected*
C2328		central store room - adhesive below VFC	Adhesive	<1g	No Asbestos Detected*

Polo Flat Airport

Sample No.	Client Ref.	Location	Physical Structure	Sample Description	Analysis of Fibrous Content
C2329		open hangar - infill panel on timber beam east end	Sheet	3g	No Asbestos Detected*

Non Asbestos Fibre Table
* C2324 - Organic Fibres Detected
* C2325 - Organic Fibres Detected
* C2326 - Organic Fibres Detected
* C2327 - Organic Fibres Detected
* C2328 - Organic Fibres Detected
* C2329 - Organic Fibres Detected
* C2317 - Organic Fibres Detected
* C2315 - Organic Fibres Detected
* C2322 - Organic Fibres Detected
* C2310 - Organic Fibres Detected
* C2309 - Organic Fibres Detected

The results of the tests, calibrations and/or measurements included in this document are traceable to Australian/national standards

Client: EMM 10903_T-07529_Polo Flat Airport-Fibre Identification Certificate of Analysis_20190430 Page 2 of 3

Fibre Identification Certificate of Analysis

Laboratory Report Number: 10903_T-07529 **Analyst:** Simon Saville **Page** Page **3** of **3**

* C2312 - Organic Fibres Detected
* C2307 - Organic Fibres Detected
* C2330 - Organic Fibres Detected
* C2313 - Organic Fibres Detected
* C2308 - Organic Fibres Detected
* C2331 - Organic Fibres Detected
* C2320 - Organic Fibres Detected
* C2314 - Organic Fibres Detected
* C2318 - Organic Fibres Detected
* C2321 - Organic Fibres Detected
* C2319 - Organic Fibres Detected
* C2316 - Organic Fibres Detected

Robson Approved Identifier
Simon Saville

NATA
No. 3181
Accredited for compliance with ISO/IEC 17025 - Testing

Robson Approved Signatory
Patrick Cerone

The results of the tests, calibrations and/or measurements included in this document are traceable to Australian/national standards

14.2 APPENDIX B – Plans

no plans required

14.3 APPENDIX C – HAZMAT Item locations & representative photographs

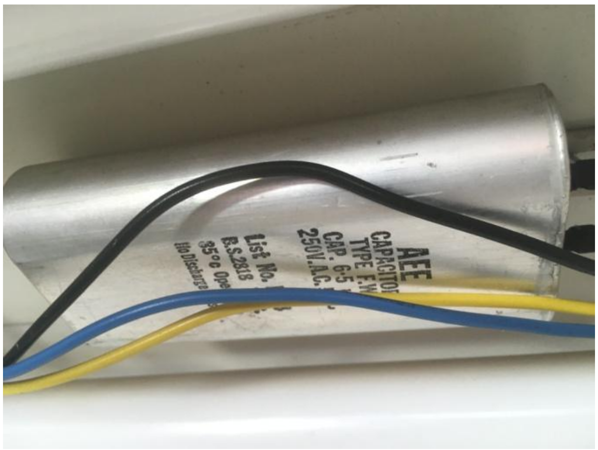
ASBESTOS - Administration Building			
SAMPLE NO	**LOCATION**	**MATERIAL DESCRIPTION**	**PHOTOGRAPH**
VA02	Ground floor toilets - Insulation to wiring	No Access to Woven product (Presumed Friable)	

ASBESTOS - Polo Flat Airport			
SAMPLE NO	**LOCATION**	**MATERIAL DESCRIPTION**	**PHOTOGRAPH**
VA01	Ground floor hangar west end - electrical switchboard backing	Sheet (Presumed Non-Friable)	

LEAD PAINT - Administration Building			
ITEM NO	**LOCATION**	**Lead %**	**PHOTOGRAPH**
PB1345	Ground floor throughout - window and door trims	0.11	
PB1341	Ground floor throughout - internal wall	0.11	
PB1340	Ground floor throughout - window and door trims	0.11	
PB1346	Exterior throughout- walls	0.11	
PB1344	Exterior throughout- walls	0.11	
PB1343	Exterior throughout - window and door trims	0.11	
PB1342	Exterior throughout - gutters	0.11	

LEAD PAINT - Polo Flat Airport			
ITEM NO	**LOCATION**	**Lead %**	**PHOTOGRAPH**
PB1339	Ground floor open hanger - to structural beams	0.11	
PB1338	Ground floor open hanger - to wall and trims	0.11	

SMF - Administration Building			
ITEM NO	**LOCATION**	**MATERIAL TYPE**	**PHOTOGRAPH**
SMF1219	Ground floor laundry – to hot water heater	Insulation	
SMF1213	Ground floor office ceiling space	Ceiling void	No photograph available

POLYCHLORINATED BIPHENYLS - Administration Building			
ITEM NO	**LOCATION**	**MATERIAL TYPE**	**PHOTOGRAPH**
PCB469	Ground floor warehouse and art workshop	AEE - FW	

OZONE DEPLETING SUBSTANCES - Administration Building			
ITEM NO	**LOCATION**	**MATERIAL TYPE**	**PHOTOGRAPH**
ODS738	Ground floor offices, AC wall unit	R-22 Chlorodifluro methanet	

STORAGE FUEL DRUMS - Polo Flat Airport			
ITEM NO	**LOCATION**	**MATERIAL**	**PHOTOGRAPH**
FD112	Ground floor open hanger south end	Fuel drums	

14.4 APPENDIX D – Hazardous Material Management Information

ASBESTOS

Some 3000 products have been manufactured using asbestos, of which cement sheeting, pipe insulation, textiles, gaskets, vinyl floor tiles and fire door cores are the most commonly encountered. The mineral asbestos (i.e. Crocidolite, Chrysotile and Amosite and other forms) is classified by the National Occupational Health and Safety Commission as a Category 1 carcinogen. If respirable asbestos fibres are inhaled they may cause an inflammatory response, which in turn may lead to asbestosis (scarring of the lung), mesothelioma (cancer of the pleura or peritoneum) or lung cancer.

It is illegal under Commonwealth, State and Territory legislation to manufacture asbestos building materials or to reuse asbestos products.

Asbestos sheeting or ‘fibro’ is bonded into a stable matrix and as such does not present an exposure hazard unless it is cut, abraded, sanded or otherwise disturbed. This material is referred to as non friable ACM. Friable ACM has the potential to release fibre with only minor disturbance.

The health risks associated with asbestos exposure increase with the fibre type, level and frequency of exposure. Crocidolite (blue asbestos) is the most hazardous type. Amosite (brown asbestos) is not as hazardous as crocidolite but is significantly more hazardous than chrysotile (white asbestos). Exposure to all types of asbestos can result in diseases including asbestosis, lung cancer and mesothelioma. Smoking increases the risk of disease 50 fold. The often heard adage ‘ one fibre can kill you” is overly simplistic. Evidence indicates that risk increases with the level, type and frequency of exposure. Some individuals may be predisposed to disease at low and infrequent exposure, while others suffer no ill effect even after prolonged industrial exposure. We do not know what level can be considered safe nor what level may be considered hazardous. Asbestos may also be naturally present in the environment at very low levels. Therefore controls should be implemented to avoid exposure as far as practicable.

Asbestos is only hazardous if it becomes airborne and inhaled. When it is fully encapsulated within the structure it cannot become airborne. Simple engineering controls can ensure it remains encapsulated. These controls are detailed in the Required Actions and Recommendations detailed in this report.

Provided the site has been inspected by a licensed Asbestos Assessor and their recommendations adopted, normal occupation would not be hazardous. It is vital that any maintenance or renovation be in strict accordance with the Assessor’s recommendations.

Any person employed to undertaken any maintenance or refurbishment must be informed of the presence of friable and/or non friable asbestos in the premises. The PMCW must ensure that if planned work may impact on any asbestos materials, the asbestos is removed or remediated by the appropriate class of removalist prior to commencement.

LEAD PAINT

Introduction

Lead in paint (as lead carbonate) is found extensively in homes and commercial and industrial buildings built pre-1970. Although Australian industry has generally phased out lead content in paint, levels of below 1 percent are still permitted and industrial application of high-lead paint to residential/commercial dwellings may still continue.

Lead-based paint may be a health issue if it becomes mobile in the environment or if ingested. For this reason, sealing or safe removal of paint is strongly recommended particularly where it is flaking or exposed to the elements.

Assessment Criteria

Lead paint is defined by the Australian Standard (AS 4361.2 – 2017 Guide to hazardous paint management Part 2: Lead paint in residential, public and commercial buildings) as a paint or component coat of a paint system containing lead or lead compounds, in which the lead content (calculated as lead metal) is in excess of 0.1% by weight of the dry film as determined by laboratory testing.

Lead Paint Management and Recommendations

The following information uses Australian Standard (AS 4361.2 – 2017) as the primary reference. Lead paint in residential and commercial premises may be managed in one of four ways:

- Leave undisturbed
- Stabilised (i.e. over painting or encapsulation)
- Abated (i.e. removed)
- A combination of the three management options may be required

Should removal be chosen, a high degree of skill, preparation and risk minimisation is required to avoid lead exposure, as dry sanding of lead levels as low as 0.1% can generate high lead dust. Therefore, the Wet Scraping and Wet Sanding methods are amongst the safest methods available.

Strict adherence to the guidelines described in AS 4361.2 – 2017 will best ensure minimisation of risk. During this process personal protective equipment and waste containment equipment is essential and children, pregnant women and persons not directly engaged in the process should not be present. General workers may undertake this process providing they adhere strictly to the guidelines, however, a specialist lead paint removal contractor is recommended for extensive paint removal works.

Where remediation is required it is important to minimise ongoing maintenance costs by ensuring that the works are undertaken by a professional who is able to give a significant time guarantee of the painted surfaces at the completion of the works. The following website lists contactors by postcodes that have been included based on their indicated skills and training in working safely with lead paint. http://www.lead.org.au/paintersall.html. These contractors should however be assessed by current performance prior to engagement.

Responsibilities of Owners and Contractors

According to AS 4361.2 – 2017 owners of residences or commercial buildings that may contain lead should:

- Manage the property in such a manner as to effectively control any health risk to occupants, contractors or others
- Ensure occupants are sufficiently informed about and protected from the hazards associated with lead paint
- If management work is to be undertaken, inform immediate neighbours about the nature of the work

Contractors should:

- Obtain appropriate accreditation to undertake the proposed level of remedial work involving lead paint and have the required level of specialized training
- Undertake the contracted work in such a way as to protect the health and safety of employees, tenants and the general public

SYNTHETIC MINERAL FIBRE

SMF refers to man-made mineral fibrous materials commonly used for their insulating and reinforcing properties. The amorphous (non-crystalline) materials include glass fibre, mineral wool and ceramic fibre products.

Discussion

Although glass fibre is classified as an irritant, levels of airborne fibreglass during routine occupation of the premises would be insignificant. During any large-scale installation or removal of fibreglass insulation, providing SMF fibre suppression measures as defined below are employed, exposure standards for SMF fibre would not normally be exceeded.

The following Risk Assessment is based on the requirements of Worksafe Australia, WorkSafe Australia, Sydney 1990, *Synthetic Mineral Fibres: National Standard and National Code of Practice.*

SMF Risk Assessment

According to Worksafe Australia 1990 (p 9) health risks associated with SMF are "significantly less potent … than white asbestos (Chrysotile) fibres" and that "...the possibility of lung cancer is eliminated at an exposure standard (time weighted average) of 0.5 respirable fibres per millilitre of air for all types of synthetic mineral fibres...." (p V).

To reduce the possibility of skin, eye and upper respiratory tract irritation a maximum exposure standard of 2 milligrams per cubic metre of inspirable dust is recommended. These two standards are designed principally for the manufacture and end user industries in which significant dust clouds would be generated.

The same document also states: "The overall conclusion based on available animal experiments and epidemiology is that provided work is carried out in accordance with (NOHSC 1990), and compliance is maintained with the exposure standards, then there is a negligible health risk associated with exposure to SMF under present-day manufacturing and usage patterns."

PCB

PCB is the common name for Polychlorinated Biphenyls. PCBs range in appearance from colourless, oily liquids to more viscous and increasingly darker liquids, to yellow then black resins, depending on chlorine content of the PCB.

Discussion

The major use of PCBs in the electrical industry has been as an insulating fluid inside transformers and capacitors. These transformers and capacitors have ranged in size from the very large transformers typically used by electrical supply companies, to the small capacitors used in commercial products. Capacitors containing PCBs were installed in various types of equipment including fluorescent light fittings during the 1950s, 60s and 70s.

Risk Assessment

Small quantities of PCBs are usually found in sealed containers known as capacitors. PCB-containing capacitors are unlikely to pose a health risk, unless they become damaged and leak.

PCBs can enter the body in three ways:

- absorption through the skin
- inhalation of PCB vapour
- ingestion by contamination of food or drink

The most commonly observed symptom in people exposed to high levels of PCBs is a condition known as chloracne. This is a severe, persistent acne-like rash due to repeated and prolonged contact of PCBs with skin. This condition has also occurred in people who have accidentally ingested PCBs.

Very high exposure to PCBs may also cause liver damage and damage to the nervous system.

There is the possibility that PCBs may cause cancers.

The likelihood of becoming sick from PCB exposure increases with the length of time and the amount of material that a person might come in contact with.

OZONE DEPLETING SUBSTANCES

Introduction

Ozone depleting substances (ODS) are compounds that contribute to stratospheric ozone depletion. They are widely used in refrigerators, air-conditioners, fire extinguishers, in dry cleaning, as solvents for cleaning, electronic equipment and as agricultural fumigants.

Ozone depleting substances (ODS) include:
- Bromochloromethane (BCM)
- Carbontetrachloride (CCl_4)
- Chlorofluorocarbons (CFCs)
- Halons
- Hydrobromofluorocarbons (HBFCs)
- Hydrochlorofluorocarbons (HCFCs)
- Methylbromide (CH_3Br)
- Methylchloroform (CH_3CCl_3)

ODS are generally very stable in the troposphere and only degrade under intense ultraviolet light in the stratosphere. When they break down they release chlorine or bromine atoms which then deplete the ozone.

Ozone Protection Strategy

The Australian Strategy for Ozone Protection calls for personnel who handle, install, service, commission and decommission and maintain commercial and industrial refrigeration and air-conditioning equipment to be accredited, licensed, registered to work with ozone depleting substances.

Best Management Practices

In Australia a ‘Code of Good Practice’ has been drawn up with the objective of assisting the reduction of emissions into the atmosphere of substances that deplete the ozone layer and contribute to global warming.

The Australian Refrigeration and Air-conditioning Code of Good Practice (HB 40.1 – 2001) recommends best practice for the maintenance, design, servicing, labelling and manufacture of refrigeration and air conditioning systems towards this objective.

Legislation

Under the Federal Government’s *Ozone Protection and Synthetic Gas Management Act 1989* and its *Ozone Protection and Synthetic Gas Legislation Amendment Bill 2003* it is illegal to vent an ODS (Scheduled Substances) to the atmosphere.

General Maintenance

- All refrigeration and air-conditioning plant should be regularly inspected for traces of leaking refrigerant and/or oil, and for signs of leak-indicating dye
- Whenever a system is charged with refrigerant and/or lubricant, the service person must clearly label the system with the refrigerant/lubrication type; name of service organization; and date of service. In addition, the ASHRAE/ARI refrigerant designated R number shall be clearly displayed
- A service person should be aware of the possibility that a refrigeration or air-conditioning system may have been incorrectly charged or incorrectly labelled. The type of refrigerant contained in the system must therefore be first established by checking the temperature/pressure relationship or by using other tests to verify that the labelling is correct

Advice to Equipment Users

- Users are advised that persons who service refrigeration and air-conditioning equipment are required by legislation to observe the Code of Good Practice and not to ‘top-up’ or ‘charge’ systems known to be leaking refrigerant, or to service equipment unless it can be returned into service in a leak-free condition
- If a user does not have trained staff to undertake service or maintenance work, then it is recommended that a routine maintenance agreement for their plant be undertaken with a reputable service organization
- All users should monitor the operation of their installation weekly and call the service person immediately if any abnormal condition is found
- When a refrigeration system contains in excess of 50 kg of refrigerant, that system should be leak tested on a quarterly basis

Leak Testing

- Various methods may be used for leak-testing, e.g. electronic leak detectors, halide lamp and or ultraviolet lamp
- Only a non-controlled refrigerant mixed with a pressurising substance such as dry nitrogen should be used to leak test refrigeration and air-conditioning systems
- Where an air-conditioning or refrigeration system is found to be leaking and needs to be repaired, the vapour and/or liquid must first be recovered from the leaking system
- Where pressurisation testing has determined that an air-conditioning or refrigeration system is not leaking, moisture and non-condensables must be evacuated from the system using dry nitrogen as the moisture absorber and either the deep or triple evacuation methods
- All refrigerants shall be recovered and either recycled, reclaimed or held for disposal in an approved manner
- It is highly recommended that a refrigerant charge monitor or leak detector be installed to alert equipment owners/operators of a refrigerant leak

Recovery, Recycling and Disposal of Refrigerants

- It is highly recommended, and in some cases mandatory, for recovery and/or recycling equipment to be used for the removal and recovery of refrigerant during service
- To avoid the danger of mixing different refrigerant types, the receiving containers shall be identified by the correct colour coding and labelling and shall only be used for the refrigerant type that is being transferred. The recovery containers shall conform to AS 4484-2004, '*Gas Cylinders for Industrial, Scientific and Refrigerant use – labelling and colour coding'*
- As chillers have large internal volume, it is important that all refrigerant vapour be recovered. A chiller at atmospheric pressure can still hold many kilograms of refrigerant vapour after the liquid has been removed
- When recovering refrigerant from a chiller the refrigerant should be recovered until the internal system pressure is reduced to 3 kPa absolute for low-pressure systems (e.g., R-11) and 70 kPa absolute for positive pressure systems (e.g., R-12 and R-22). The internal pressure should then be taken up to atmospheric pressure with dry nitrogen if the chiller is to be opened. This will prevent moisture–laden air entering the system, which could lead to contamination and corrosion

Disposal of Refrigerants

- Unusable or surplus fluorocarbon refrigerant shall not be discharged to the atmosphere, but shall be returned to a supplier
- Empty residual refrigerant in a disposable container shall be recovered and the container disposed of at a recycling centre
- The utmost care must be taken to avoid mixing different types of refrigerants, as separation may be impossible and large quantities of refrigerant may be rendered unusable

Handling and Storage

Losses of refrigerant to the atmosphere can occur during the handling and storage of refrigerant containers. Service persons have a duty of care to avoid such losses.

- There are numerous hazards associated with the storage of refrigerant. These include asphyxiation in confined space due to leakage from refrigerant containers; and fire, which may overheat and explode refrigerant containers or decompose refrigerant into toxic substances

Alternative Refrigerants and Lubricants

- With the introduction of HFC alternative refrigerants, alternative lubricants need to be considered to ensure system reliability. Some of these alternative lubricants tend to exhibit greater hygroscopicity than mineral oils, so care must be taken to ensure they are kept in sealed containers at all times
- Care must be taken to ensure that all components used in the refrigeration/air-conditioning system are compatible with the new refrigerant and lubricant

Recovery of Fluorocarbons Mixed with other Refrigerants

A number of different refrigerants and refrigeration mixtures have been used to replace or to ‘top up’ fluorocarbon based refrigerants in refrigeration and air-conditioning systems.

In many cases the equipment in question may not be labelled to indicate that hydrocarbon or hydrocarbon mixtures have been used and as the operating pressures of these replacement refrigerants are usually similar to those of the original refrigerant, their identification in the field is extremely difficult.

- It is not safe therefore to recover flammable refrigerant (hydrocarbon) using equipment designed only for non-flammable refrigerants such as R-12 and R-134a

- Should it be suspected that refrigeration or air-conditioning system contains an unidentified mixture or, if on asking the owner, examining the labels, and/or detecting instruments indicate that a hydrocarbon/fluorocarbon mixture or any other non-standard mixture of refrigerant may be present; the following procedure should be followed:
    - If a hydrocarbon or flammable mixture that contains hydrocarbon is suspected, use only equipment designed for the recovery of flammable gasses and recover the refrigerant into a specially marked container
    - In the case of refrigerant mixtures, it is not advisable to use recovery equipment as many mixtures have very high condensing pressures, which could result in equipment failure and/or injury to persons operating, or near the equipment
    - The safest method of recovery is to use an evacuated and preferably chilled container to depressurise the system
    - Label the container to show that it contains a mixture or the suspected composition, if known, and deliver it to a supplier for recycling
    - Purge the residual gas from the system with dry nitrogen before proceeding with any repairs

Health Effects

In addition to causing environmental degradation certain ozone depleting substances may present a risk to human health when they are improperly handled or released in to a poorly ventilated area.

Inhalation

The most significant exposure route for humans is through inhalation. Refrigerant gases displace oxygen in the air making breathing difficult.

Overexposure can cause central nervous system depression and oxygen deficiency. Effects of overexposure may include light-headedness, giddiness, shortness-of-breath, headaches, and in extreme cases, irregular heartbeats, cardiac arrest, asphyxiation and death.

Symptoms of overexposure at lower concentrations may include transient eye, nose and throat irritation.

Skin Contact

Contact with rapidly released refrigerant gas may cause frostbite. Symptoms of frostbite may include changes in skin colour to white or greyish yellow.

Other direct dermal contact may result in skin de-fatting, dryness, irritation or contact dermatitis.

Standard work clothes provide adequate protection of the skin but it is recommended that lined butyl gloves and goggles be used whenever handling liquid refrigerants.

Eye Contact

Eye contact with rapidly released refrigerant or air-conditioning gas may cause severe frostbite damage to eyes and eyelids. Eye irritation may occur if exposure occurs at lower concentrations.

FUEL STORAGE FACILITIES

In NSW the management of fuel storage tanks is administered by the local Council under the Protection of the Environment Operations (Underground Petroleum Storage Systems) Regulation 2014 (UPSS Regulation) which aims to improve the environmental management of storage systems made under the Act.

The UPSS Regulation requires underground fuel storage tanks be removed once they are no longer in use, unless there are extenuating circumstances i.e. their removal undermines permanent infrastructure. This is also stated in the Australian Standard *The Removal and Disposal of Underground Petroleum Storage Tanks* (AS 4976-2008).

Safework NSW is responsible for occupational health and safety issues relating to decommissioning and removal of A/USTs from a site. The following SafeWork NSW requirements must be met during decommissioning:

- The tank and contents made safe in line with *Code of Practice: Storage and handling of dangerous goods* (NSW WorkCover Authority 2005)
- Safework NSW must be notified of abandoned tanks within 7 days

In accordance with the UPSS Regulation, removing, replacing or decommissioning of UPSS also requires that a validation report for the site must be prepared by a ‘duly qualified person’ and submitted to the relevant local authority (usually the local Council).

Based on this information and for the long-term management of the sites with redundant fuel storage tanks, Robson Environmental Pty Ltd recommends that the USTs be removed in accordance with the requirements of Safework NSW and the relevant local authority. UPSS still in use are to be managed in accordance with the requirements of the UPSS Regulation.

Removal of USTs may require approvals from the relevant local authority and should be undertaken in accordance with the UPSS Regulation and Safework NSW Guidelines.

It is noted that the management of USTs is also referred to in Section 3.2 of AS4976 (2008) *The Removal and Disposal of Underground Petroleum Storage Tanks*, which states that the out-of-service period for a UST should not exceed that laid down in any applicable regulation and should not normally be greater than twelve (12) months. The *Occupational Health and Safety (Dangerous Goods Regulation (2001)* states that where 2 years have elapsed since fuel was put into or taken from an above or underground tank it must be abandoned. Also, Section 366 of the NSW *Work Health and Safety Regulation (2011)* (Chapter 7, Part 7.1, Division 5, Subdivision 4) indicates that all decommissioned tanks must be removed unless there are specific operational or structural reasons as to why they must remain. These reasons must be outlined or substantiated by an experienced and competent person. Section 367 of the above additionally specifies that PCBU in charge of the UST must notify the regulator of the abandonment of the tank as soon as practicable after the tank is abandoned.

15 GLOSSARY

ACM	*See asbestos containing material*
Air monitoring	Air Monitoring means airborne asbestos fibre sampling to assist in assessing exposures and the effectiveness of control measures. Air monitoring includes exposure monitoring, control monitoring and clearance monitoring. *Note: Air monitoring should be undertaken in accordance with the Guidance Note on the Membrane Filter Method for Estimating Airborne Asbestos Fibres [NOHSC:3003 (2005)]*
Airborne asbestos fibres	Any fibres of asbestos small enough to be made airborne. For the purposes of monitoring airborne asbestos fibres, only respirable asbestos fibres (those less than 3µm wide, more than 5µm long and with a length to width ratio of more than 3 to 1) are counted.
Amosite	Grey or brown asbestos
AR	*See Asbestos Register*
Asbestos Containing Material	Any material, object, product or debris that contains asbestos.
Asbestos Register	Inventory of ACM by type, form, location, risk and required action.
Asbestos Removalist	A competent person who performs asbestos removal work. *Note: an asbestos removal licence is required in all State and Territory jurisdictions.*
Asbestos Survey and Management Plan	Document covering the identification, risk evaluation, control and management of identified asbestos hazards, developed in accordance with current legislation.
Asbestos[2]	The fibrous form of mineral silicates belonging to the serpentine and amphibole groups of rock-forming minerals, including actinolite, amosite, anthophyllite, chrysotile, crocidolite, tremolite or any mixture containing one or more of the mineral silicates belonging to the serpentine and amphibole groups.
Asbestos–cement (AC)	Products consisting of sand aggregate and cement reinforced with asbestos fibres (e.g. asbestos cement pipes and flat or corrugated asbestos cement sheets).
ASCC	*See Safe Work Australia Council*
Non-friable asbestos	ACM that is bonded into a stable matrix and cannot be reduced to a dust by hand pressure.
Chrysotile	White asbestos
Clearance inspection	An inspection, carried out by a licensed Asbestos Assessor, to verify that an asbestos work area is safe to be returned to normal use after work involving the disturbance of ACM has taken place. A clearance inspection must include a visual inspection, and may also include clearance monitoring and/or settled dust sampling.
Clearance monitoring	Air monitoring using static or positional samples to measure the level of airborne asbestos fibres in an area following work on ACM. An

	area is ‘cleared’ when the level of airborne asbestos fibres is measured as being below 0.01 fibres/mL.
Control monitoring	Air monitoring, using static or positional sampling devices to measure the level of airborne asbestos fibres in an area during work on ACM. Control monitoring is designed to assist in assessing the effectiveness of control measures. Its results are not representative of actual occupational exposures, and should not be used for that purpose.
Crocidolite	Blue asbestos
Exposure monitoring	Air monitoring in the breathing zone to determine a person’s likely exposure to a hazardous substance. Exposure monitoring is designed to reliably estimate the person’s exposure, so that it may be compared with the National Exposure Standard.
HMSMP	*See hazardous material survey re-inspection and management plan*
In situ[2]	Fixed or installed in its original position, not having been removed.
Inaccessible areas	Areas which are difficult to access, such as wall cavities and the interiors of plant and equipment.
Licensed Asbestos Assessor	Person who is qualified to undertake the identification and assessment of asbestos and provide recommendations on its safe management.
Membrane	A flexible or semi-flexible material, which functions as the waterproofing component in a roofing or waterproofing assembly.
NATA	National Association of Testing Authorities
NOHSC *(now SWA)*	National Occupational Health and Safety Commission (*now known as Safe Work Australia)*
PMCW	Person with management or control of a workplace
Safe Work Australia Council (SWAC)	A council that provides a national forum for State and Territory governments, employers and employees to consult and participate in the development of policies relating to OHS and workers' compensation matters, and promote national consistency in the OHS and workers' compensation regulatory framework.
SWMS	Safe Work Method Statement

16 REFERENCES

- *How To Manage and Control Asbestos In The Workplace Code of Practice*
- *How To Safely Remove Asbestos Code of Practice*
- *Work Health and Safety Act 2011*
- *Work Health and Safety Regulations 2011*
- *ANZECC 1997, Identification of PCB-Containing Capacitors; An information Booklet for Electricians and Electrical Contractors*
- *Guide to Hazardous Paint Management Part 2: Lead paint in residential, public and commercial buildings Standards Australia, AS 4361.2 – 2017*
- *Standards Australia, HB 40.1 – 2001 The Australian Refrigeration and Air-conditioning Code of Good Practice*
- *WorkSafe Australia, Sydney 1990, Synthetic Mineral Fibres: National Standard and National Code of Practice*

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